



# THE MORBIDITY MANAGEMENT AND DISABILITY PREVENTION PROJECT

Final Report

September 2019



**USAID**  
FROM THE AMERICAN PEOPLE



*This publication was made possible by the generous support of the American people through the United States Agency for International Development (USAID) under Cooperative Agreement No. AID-OAA-A-14-00054. It was produced by Helen Keller International for review by USAID; the authors' views expressed in this publication do not necessarily reflect the views of USAID or the United States Government.*

Cover photo: © William Nsai

## Acknowledgements

There are many organizations and individuals at the global and country level whose commitment, expertise, and enthusiasm contributed to the success of the MMDP Project during its five years. First and foremost, we would like to thank the **thousands of individuals and their families** who entrusted their health care to the project-supported activities and benefited from surgery and other services, allowing us to learn how best to scale up and improve morbidity management.

At the community level, the project relied heavily on community leaders, local authorities, and the dedicated **community health workers and volunteers** who ensured that campaigns were well-attended and successful. Your devotion to the well-being of your communities is commendable and deeply appreciated.

This project would not have been possible without the leadership of the ministries of health in Burkina Faso, Cameroon, and Ethiopia, especially the **dedicated NTD program managers** at all levels who continue to work tirelessly to eliminate these diseases and to address the morbidity associated with them. Hats off to you for your sustained efforts, your remarkable achievements to date, and your devotion.

We gratefully acknowledge not only the generous financial **support from USAID** but also the three-person team with whom we worked most closely: Emily Wainwright, the Agreement Officer's Representative; Aryc Mosher, Trachoma; and Emily Toubali, Lymphatic Filariasis (LF). We thank them for their guidance, steadfast support, and technical expertise.

In Ethiopia and Cameroon, Helen Keller International (HKI) was fortunate to have **implementing partners** who knew the countries well and brought their combined experience, talent, and resources to bear. RTI International with their partners the Fred Hollows Foundation and Light For The World accomplished outstanding results in a country where the trichiasis burden is particularly significant while Sightsavers successfully implemented the project in one of the most challenging regions of Cameroon, the Far North.

Two other partners provided thoughtful insights and technical guidance, one for trachoma (the Kilimanjaro Centre for Community Ophthalmology) and the other for LF (the African Filariasis Morbidity Project). We are particularly grateful to Dr. Sunny Mante of the African Filariasis Morbidity Project for his tireless efforts to train hydrocele surgeons and for his creativity in helping to design and produce a surgical simulator for training in hydrocele surgery.

In each country dedicated teams composed of HKI staff in Burkina Faso and Sightsavers and HKI in Cameroon and RTI, Fred Hollows Foundation, and Light for the World in Ethiopia made tremendous progress in achieving the MMDP Project's objectives and targets. Working closely with the respective ministries of health and other partners, they worked day in and day out, bringing all their technical expertise and negotiating skills to bear to ensure that quality care was delivered and local capacity was strengthened. We are deeply indebted to them.

The list of all the international organizations with which the project collaborated over five years is too long to list here, but we would like to acknowledge the following colleagues and friends for going above and beyond their official roles to provide support and technical guidance:

- At WHO/ESPEN: Drs. Didier Bakajika, Amir Bedri Kello, Jonathan King, and Anthony Solomon
- At CDC: LeAnne Fox and Caitlin Worrell
- At GAELF: Dr. Charles MacKenzie

A number of short- and long-term consultants, too numerous to include here, supported different aspects of the project. Among the long-term consultants who devoted considerable time and expertise to the project, we would like to recognize Dr. Catherine deVries, Dr. Emily Gower, Dr. Adama Guira, Dr. André Kengmogne, Chad MacArthur, Dr. Sunny Mante, and Zeina Sifri.

Also providing sustained support to the project were the LF and Trachoma Technical Advisory Boards, chaired by Dr. Charles MacKenzie and Dr. Emily Gower, respectively. These consultative bodies ensured that the project adhered to the latest international standards for MMDP and that its activities were aligned with WHO NTD program and priorities. The members, comprised of technical experts from WHO, USAID, HKI, and other organizations, gave generously of their time and expertise to discuss past activities, upcoming plans, and challenges the project was facing.

The MMDP Project

## Acronyms & Abbreviations

BG	Beneshangul-Gumuz
CBHWs	Community-Based Health Workers
CDC	Centers for Disease Control and Prevention
CNTD	Centre for Neglected Tropical Diseases
CSPS	Health and Social Promotion Center ( <i>Centre de Santé et de Promotion Sociale</i> )
DFID	UK's Department for International Development
DIP	Direct Inspection Protocol
DMT	Dedicated Mobile Teams
DRS	Regional Health Directorate ( <i>Direction Régionale de la Santé</i> )
EMMP	Environmental Mitigation and Monitoring Plan
ESPEN	The Expanded Special Project for Elimination of Neglected Tropical Diseases
FASTT	Filaricele Anatomical Surgical Task Trainer
FMOH	Federal Ministry of Health
GAELF	Global Alliance to Eliminate Lymphatic Filariasis
HD	Health District
HDA	Health Development Army
HEAD START	Human Eyelid Analog Device for Surgical Training and Skills Reinforcement in Trachoma
HEW	Health Extension Worker
HKI	Helen Keller International
ICTC	International Coalition for Trachoma Control
IEC	Information, Education and Communication
IECW	Integrated Eye Care Workers
IESO	Integrated Emergency Surgical Officers
IR	Intermediate Results
LF	Lymphatic Filariasis
LSHTM	London School of Hygiene and Tropical Medicine
M&E	Monitoring and Evaluation
MDA	Mass Drug Administration
MMDP	Morbidity Management and Disability Prevention
MMMM	Monthly Morbidity Management Meeting
MOH	Ministry of Health
NaPAN	National Podoconiosis Action Network
NTD	Neglected Tropical Diseases
PNLCé	National Blindness Prevention Program ( <i>Programme National de Lutte contre la Cécité</i> )
PNLO	National Onchocerciasis Control Program ( <i>Programme National de Lutte contre l'Onchocercose</i> )
PNTMN	National Neglected Tropical Disease Control Program ( <i>Programme National de lutte contre les Maladies Tropicales Négligées</i> )
PTT	Post-operative TT
RFA	Request for Application
RHB	Regional Health Bureau
SNNPR	Southern Nations, Nationalities and Peoples' Region
SSE	Surgical Society of Ethiopia
TAB	Technical Advisory Board
TAP	Trachoma Action Plan
TAS	Transmission Assessment Survey
TF	Trachomatous inflammation- Follicular
TOT	Training of Trainers
TSIW	Trachoma Scientific Informal Workshop
TT	Trachomatous Trichiasis
USAID	United States Agency for International Development
WHO	World Health Organization
WoHO	Woreda Health Offices



# Table of Contents

Acknowledgements ..... 3

Acronyms & Abbreviations..... 4

Table of Contents ..... 5

Executive Summary .....7

Project Overview ..... 9

MMDP Project Support to Trachoma Programs .....12

MMDP Project Support to Lymphatic Filariasis Programs.....13

Key Global Contributions.....15

Overview of Achievements by Intermediate Result .....21

Key Achievements in Burkina Faso .....26

Key Achievements in Cameroon .....42

Key Achievements in Ethiopia .....56

Health Systems Strengthening..... 70

Monitoring, Evaluation, and Learning ..... 72

Operational Aspects ..... 74

Challenges and Lessons Learned ..... 76

Promising Practices and Recommendations ..... 79

Conclusion .....81

Appendix A: MMDP Project Summary Data Tables .....83

Appendix B: MMDP Project Resource Guide .....86

Appendix C: Key Partners ..... 87

Appendix D: Principal Consultants .....88

Appendix E: Presentations and Contributions at International Meetings .....89



Ministère de la Santé

Ministère de la Santé  
Direction de la Santé  
Délegation

Maladie, les Epidémies  
Santé Publique du Nord

*Campagne Ch.*

Registre des cas

District de santé de: *24*

Aire de Santé



USAID  
FROM THE AMERICAN PEOPLE



Helen Keller  
INTERNATIONAL

MMDP  
PROVISE



## Executive Summary

Tens of millions of people are at risk of blindness from trachoma, and disability and disfigurement due to lymphatic filariasis (LF). For both trachoma and LF, the World Health Organization (WHO) criteria for validating the elimination of these diseases as public health problems include morbidity management. Unless this issue is addressed, elimination of trachoma and LF as public health problems cannot be achieved. To strengthen national ownership and the capacity of select African countries to deliver high-quality treatment and disease management services for people suffering from the morbidity and disability caused by these two diseases, the United States Agency for International Development (USAID) awarded a five-year Cooperative Agreement for morbidity management and disability prevention (MMDP) to Helen Keller International (HKI) in July 2014 (Cooperative Agreement No. AID-OAA-A-14-00054). To achieve the goal of improving the capacity of national programs to manage trachomatous trichiasis (TT), the blinding stage of trachoma, and hydrocele and lymphedema resulting from LF complications, HKI, in consultation with USAID, designed the activities of the Morbidity Management and Disability Prevention Project (MMDP Project) around four intermediate results (IRs):

1. Strengthened MMDP data availability and quality for decision-making at the country level.
2. Strengthened support for MMDP implementation scale-up and quality improvement at the country level.
3. Strengthened capacity of MMDP systems within ministries of health.
4. Provision of global leadership through building upon the knowledge and evidence base for MMDP preferred practices and policy.

The project's activities, implemented primarily in Burkina Faso, Cameroon, and Ethiopia and at the global level, complemented USAID's significant investment in mass drug administration to interrupt transmission of trachoma and LF. Disease management at the country level focused primarily on surgery for TT and hydrocele and, to a lesser extent, on lymphedema management. Two guiding principles underpinned the project's approach. First, the national neglected tropical diseases (NTD) programs within the ministries of health (MOH) would lead implementation to ensure that each country's priorities were met and that capacity at all levels—national, regional, district, and community—would be created and reinforced throughout the life of the project and beyond.

Second, ensuring the inclusion of all key stakeholders in each country and within the global community meant creating and maintaining strong partnerships. To this end, the project worked directly with the African Filariasis Morbidity Project, the Kilimanjaro Centre for Community Ophthalmology, Sightsavers International in Cameroon, and RTI International in Ethiopia (with the Fred Hollows Foundation and Light for the World). Principal global partners included WHO and the Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN), the Centers for Disease Control and Prevention (CDC), the major international non-governmental organizations for LF and trachoma, and other NGOs. The dynamic partnerships developed during implementation and the sustained commitment of national NTD program managers ensured visible progress for each of the four intermediate results. Illustrative examples include:

**IR 1: Strengthened MMDP data availability and quality for decision-making:** The project worked closely with WHO and leading partners to test and help finalize global tools for harmonized data collection activities such as burden assessments, situation analyses, and Direct Inspection Protocols. In each country, national programs developed standardized and comprehensive MMDP data collection tools and established improved data flow and reporting structures; training ministry staff in MMDP data management contributed to the achievement of this IR. The operationalization of MMDP data management systems generated key information that the three countries are incorporating into their existing health information systems and elimination dossiers and sending to WHO to fill existing gaps in global morbidity databases.

**IR 2: Strengthened support for MMDP implementation scale-up and quality improvement:** In all three countries, ministries of health successfully increased service provision for TT and LF disease management at the community and health facility level. Since demonstrating the capacity to provide quality services for morbidity is a critical component for the elimination dossiers for both trachoma and LF, the ministries of health prioritized quality improvement for MMDP service provision, including infection control and health care waste management. Training and supervision of various cadres involved in TT surgery, hydrocele surgery, and lymphedema management constituted the primary means for expanding and improving the human resource pool. These measures for scaling up the provision of MMDP services utilized WHO standards for TT and hydrocele surgery as well as other international preferred practices such as supportive supervision, follow-up of operated cases, and analysis of TT and hydrocele surgical quality data as part of ongoing monitoring.

### Improving quality of life

Project achievements included over 2.1 million people screened and 76,000 managed for trichiasis; 2,100 hydrocele surgeries performed; and 280 trichiasis surgeons trained as well as 200 hydrocele surgeons.

**IR 3: Strengthened capacity of MMDP systems within ministries of health:** National ownership of planning, implementation, and monitoring and evaluation (M&E) was critical to ensuring that MMDP Project efforts were well-coordinated with other partners in the country and that improvements initiated during the project would be sustained. With key actors from ministries of health leading these processes, the national programs now have the pools of national trainers, tools and materials, cadres of trained surgeons,<sup>1</sup> technical support, and coordination mechanisms that are needed to sustain improved capacity to deliver high-quality MMDP services. Other capacity strengthening mechanisms included i) supporting TT and hydrocele surgery post-operative follow-up; ii) routine forecasting, procurement, and distribution of pharmaceutical, consumable, and durable good needs for service provision; and iii) systematically documenting TT surgery refusals and referrals. Environmental mitigation and monitoring was another critical part of project activities to mitigate risks related to infection and environmental harm. With these innovations laying the groundwork for sustaining disease elimination gains over time, national programs are now better equipped with the knowledge and experience needed to continue implementing these mechanisms after the end of the project.

**IR 4: Provision of global leadership for MMDP preferred practices and policy:** The project engaged with global partners, including WHO and CDC, to develop and refine tools and resources for trachoma and LF. Systematic sharing of preferred practices, tools, and lessons learned from the country level contributed to the global MMDP community's knowledge base and has provided proven resources that can continue to enhance other MMDP programs after the project's close.

In its leadership role, the project supported two trachoma operational research initiatives in collaboration with ministries of health: i) research in Ethiopia on a promising new technique for post-operative TT surgery developed by Johns Hopkins University (ongoing) and ii) use of photo taking in Burkina Faso and Cameroon to predict TT surgical outcomes and potentially serve as a capacity strengthening tool for surgeons (resource package developed). These research activities are filling existing gaps in global knowledge related to TT and post-operative TT management interventions. For the global LF community, the project contributed to a number of important WHO tools and resources including the LF MMDP Toolkit, the 2019 hydrocele surgery expert consultation report, and the LF MMDP Training Package.

Although the project achieved its major objectives and targets, there were challenges, especially at the country level. Resource constraints were and will continue to be a factor. The competing priorities for the few ministry staff available—often working on several NTD projects from multiple donors at the same time—meant that some activities were delayed and bringing stakeholders together to develop long-range plans and to work on the elimination dossiers did not always happen in a timely manner. A second challenge was security and physical access in project-supported areas. Over the five years of the project, each country experienced civil unrest, extremist insurgency, and/or regional conflict, which periodically limited the mobility of health care providers and patients. Finally, TT case finding and service provision in low-endemicity settings such as Cameroon require more human and financial resources as programs begin to rely on door-to-door case finding. Sending even a minimally-staffed campaign team to provide services can result in a relatively high cost per patient ratio. On the other hand, this shift in strategy provided valuable lessons and solutions for the national program, which can be applied to other low burden settings.

### Tools and resources developed

Among the contributions are a surgical simulator for hydrocele surgery, a manual for training trichiasis surgeons, a resource package for photo taking during trichiasis surgery, and a training package for filaricelce surgery.

As USAID's flagship program for NTD morbidity management, the MMDP Project coordinated local and international partners' work in country and at the global level, strengthened national NTD programs and health systems, assisted countries in making significant progress toward trachoma and LF elimination goals, promoted the use of WHO preferred practices, and developed new tools and resources for the wider trachoma and LF communities. Most importantly, the combined efforts of dedicated national NTD program managers and the MMDP Project team provided a new chance at life for thousands of people. The capacity built and the resources developed will continue to be used in Burkina Faso, Cameroon, and Ethiopia and in the wider NTD community.

The following final report provides country-specific details on the lasting progress made in improving the provision of morbidity management services and advancing elimination dossier preparation, highlights contributions at the global level, discusses challenges encountered during implementation, describes lessons learned, and presents suggestions for next steps to reinforce the MMDP activities in each country, with the goal of eliminating trachoma and LF as public health problems. Throughout this report, the terms “the MMDP Project” and “the project” refer to the national NTD programs within ministries of health and all partners involved in implementation.

<sup>1</sup> The term “surgeon” is used throughout this document to denote different categories of surgical care providers, including physicians.



## Project Overview

In 2013 the United States Agency for International Development (USAID) expanded its landmark funding for NTDs by releasing a Request for Application (RFA) to address the morbidity and disability consequences of trachoma and LF. USAID had led the way in addressing the seven NTDs responsive to preventive chemotherapy, specifically, LF, onchocerciasis, schistosomiasis, three soil-transmitted helminths, and trachoma. USAID's investment allowed countries to scale up safe and effective mass drug administration (MDA) for these seven diseases, leveraging drug donations from various pharmaceutical companies. By the time the RFA was issued, USAID had provided over \$300 million to 24 countries, enabling them to treat over 386 million people. These funds also allowed for epidemiologic mapping, district level planning, drug forecasting, social mobilization, monitoring and evaluation, and other essential activities for MDA.

Though the success of USAID and other donors' investments for MDA was evident, the focus was almost exclusively on preventive chemotherapy, leaving morbidity management and disability prevention (MMDP) issues lagging. For both trachoma and LF in contrast to the other NTDs, WHO criteria for validation of elimination as a public health problem include morbidity management and unless these issues are addressed, elimination of trachoma and LF as a public health problem cannot be achieved. For trachoma, trachomatous trichiasis (TT) must be below 0.2% among the adult population in each endemic health district<sup>1</sup> as measured through population-based prevalence surveys. For LF, a country must demonstrate its capacity to deliver a minimum package of care to all people affected by LF morbidity; this package includes access to hydrocele surgery and management of lymphedema. Currently, an estimated 25 million men have genital disease (most commonly hydrocele) and almost 15 million people, the majority of them women, have lymphedema or elephantiasis of the leg.<sup>2</sup> In addition, approximately 2.5 million people are estimated to suffer from TT and be at risk of blindness unless they have surgery or other forms of management.<sup>3</sup>

USAID's recognition of the need to address trachoma and LF morbidity to achieve elimination resulted in the awarding of a five-year \$35 million Cooperative Agreement to Helen Keller International (HKI) in August 2014. The project was subsequently named the Morbidity Management and Disability Prevention Project (MMDP Project).

The goal of the MMDP Project was to strengthen national ownership and capacity within select African countries and to scale up the provision of quality services for the management of morbidity and prevention of disability related to trachoma and lymphatic filariasis. To achieve this goal, the project focused on four intermediate results (IRs), which would contribute to the achievement of elimination targets:

1. Strengthened MMDP data availability and quality for decision-making at the country level.
2. Strengthened support for MMDP implementation scale-up and quality improvement at the country level.
3. Strengthened capacity of MMDP systems within ministries of health.
4. Provision of global leadership through building upon the knowledge and evidence base for MMDP preferred practices and policy.

Although the original RFA named six countries (Burkina Faso, Ethiopia, Niger, Nigeria, Tanzania, and Uganda), the funding landscape for TT significantly changed between the time the RFA was released and the award was made. Initially, very few donors other than the Conrad N. Hilton Foundation were funding TT activities. In early 2014, the Queen Elizabeth Diamond Jubilee Trust awarded GB £ 42.8 million to the International Coalition for Trachoma Control (ICTC) through Sightsavers to address blinding trachoma in Commonwealth countries in Africa. At the same time the UK's Department for International Development (DFID) was also planning to make significant investments in NTDs, including trachoma. Since some of the countries targeted by these donors were also cited in the USAID RFA, the project decided to focus on three countries: Burkina Faso, Cameroon, and Ethiopia.

The project's overall strategy was to emphasize country ownership and to strengthen partnerships, recognizing that without these two elements achieving elimination, completing elimination dossier submission, and receiving WHO validation would not be possible. In addition to the respective ministries of health at the various levels of the health system, the project worked directly with the African Filariasis Morbidity Project, the Kilimanjaro Centre for Community Ophthalmology, RTI International with the Fred Hollows Foundation and Light for the World in Ethiopia, and Sightsavers in Cameroon.

<sup>1</sup> Health districts are referred to as districts for the rest of the report.

<sup>2</sup> [https://www.who.int/lymphatic\\_filariasis/epidemiology/en/](https://www.who.int/lymphatic_filariasis/epidemiology/en/)

<sup>3</sup> [https://www.who.int/lymphatic\\_filariasis/epidemiology/en/](https://www.who.int/lymphatic_filariasis/epidemiology/en/)

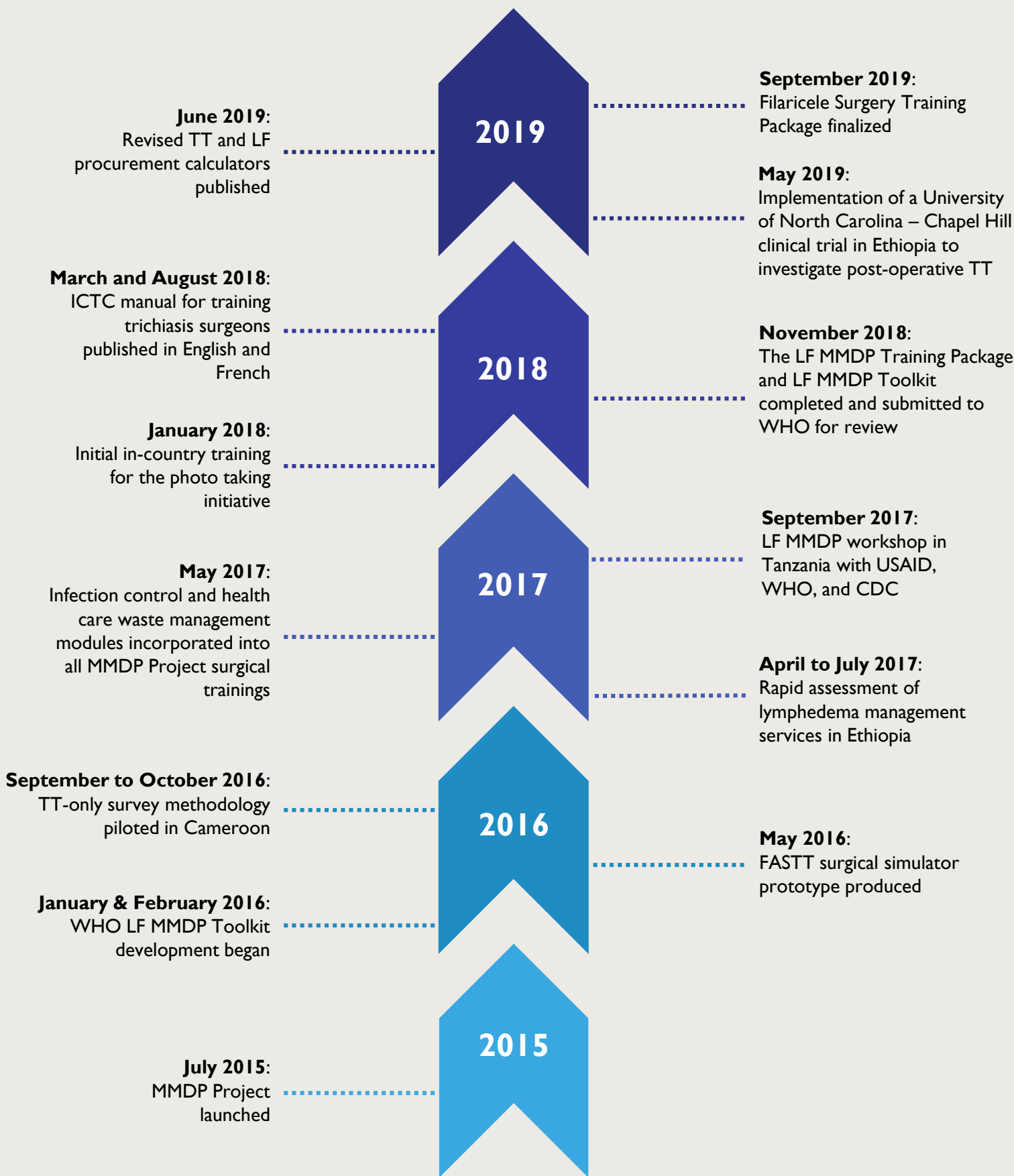
To contribute to the project's technical direction, two Technical Advisory Boards (TABs) were organized, one for trachoma and one for LF. These consultative bodies ensured that the project adhered to the latest international standards for MMDP and that its activities were aligned with WHO NTD program and priorities. The members, comprised of technical experts from WHO, USAID, HKI, and other organizations, gave generously of their time and expertise to discuss past activities, upcoming plans, and challenges the project was facing. The work with partners, the TABs, and others enabled the MMDP Project to develop preferred practices and tools that strengthened national programs and contributed to global knowledge.

The project primarily focused on surgery for trichiasis and hydrocele and to a lesser extent management of lymphedema. For the surgical components, the emphasis was on strengthening national programs' capacity to provide safe and high-quality surgery. This was accomplished by promoting the use of the Human Eyelid Analog Device for Surgical Training and Skills Reinforcement for Trachoma (HEAD START) simulator for training in TT surgery and developing a similar training simulator for hydrocele surgery called the Filaricel Anatomical Surgical Task Trainer (FASTT). Each simulator is featured in a project-developed training package, one for trichiasis surgery and one for hydrocele surgery.

The project also filled a gap in NTD surgical programs by consistently highlighting the importance of infection control and health care waste management to protect not only the patients and health care workers but the communities as well. Building capacity in supportive supervision was another element that the MMDP Project focused on.

As activities drew to a close, the project worked with partners such as Sightsavers to identify remaining challenges and share information to facilitate the ongoing efforts towards the goal of trachoma elimination. For LF morbidity, the donor landscape is much more limited, leaving few if any partners other than the respective ministries of health to carry on after the project's financial and technical support ended.







# MMDP PROJECT SUPPORT TO TRACHOMA PROGRAMS

Progress toward elimination of trachoma as a public health problem:

## ACROSS



# 2.1 MILLION

PEOPLE SCREENED



# 78,000

PEOPLE CONFIRMED WITH TRICHIASIS



# 76,000

PEOPLE MANAGED FOR TRICHIASIS



## TRAINING

Successful community-based trichiasis surgery campaigns rely on training teams of dedicated individuals:



# 280

TRICHIASIS SURGEONS,  
INCLUDING 187 SURGEONS  
NEWLY CERTIFIED



# 17,000

CASE FINDERS &  
COMMUNITY MOBILIZERS



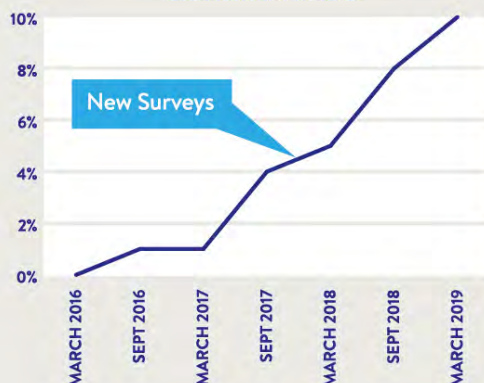
# 600

CAMPAIGN  
ORGANIZERS

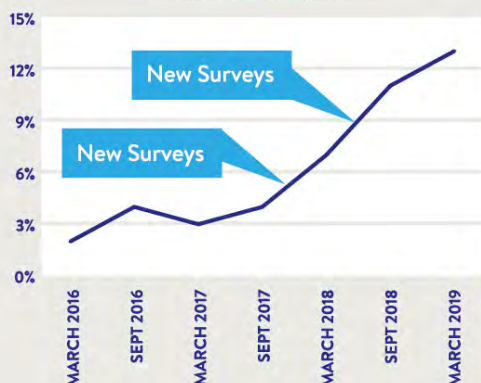
## PERCENTAGE OF ELIMINATION TARGET ADDRESSED

With each TT case offered trichiasis management options, countries make progress toward elimination.  
As new trachoma surveys are conducted, progress may change.

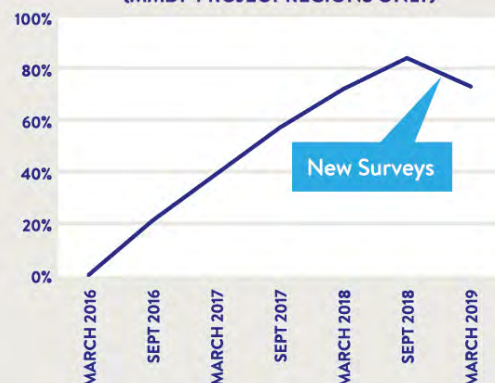
### BURKINA FASO



### CAMEROON



### ETHIOPIA (MMDP PROJECT REGIONS ONLY)





# MMDP PROJECT SUPPORT TO LYMPHATIC FILARIASIS PROGRAMS

Progress toward elimination of lymphatic filariasis as a public health problem:



# 261

DISTRICTS WITH PATIENT ESTIMATIONS



# 91

FACILITIES ASSESSED FOR LYMPHEDEMA MANAGEMENT



# 37

FACILITIES ASSESSED FOR HYDROCELE SURGERY

## SERVICES PROVIDED ACROSS



# 2,100

MEN PROVIDED HYDROCELE SURGERY



# 2,200

LYMPHEDEMA PATIENTS TRAINED IN SELF-CARE



## TRAINING

Successful management of lymphatic filariasis relies on training teams of dedicated individuals:



# 27

NATIONAL HYDROCELE SURGEON TRAINERS



# 200

HYDROCELE SURGEONS



# 420


HYDROCELE SURGERY SUPPORT STAFF



# 2,100

HEALTH STAFF TRAINED IN LYMPHEDEMA MANAGEMENT





*"The surgical team saved our lives and that is like giving us back our childhood. I want to say thank you so much." - Serke, a young woman in Ethiopia who, along with her sister, had trichiasis surgery*

## Key Global Contributions

Over the past five years, the MMDP Project has served as a valuable “learning lab” by adding to the global evidence base for trachoma and LF through documenting lessons learned and developing resources and tools based on those experiences. Supporting three countries, each at a different stage in scaling up high-quality trichiasis and LF management services, provided the opportunity to learn from implementing similar activities across different contexts. In trachoma, for example, supporting the provision of TT management services in a high-burden setting (Ethiopia), a comparatively lower-burden setting (Burkina Faso), and in a country entering “the last mile” of trachoma elimination (Cameroon), provided opportunities to refine approaches (such as strategies for case finding and post-operative follow-up) to address the challenges that can arise in each of those environments.

At the global level, the LF community recognizes that there is a scarcity of information on patient follow-up and long-term outcomes of hydrocele surgery. Most hydrocele patients who are operated on are rarely monitored post-operatively for complications. Working across Burkina Faso, Cameroon, and Ethiopia, the project was able to implement different hydrocele surgery management approaches, such as campaign-style and within the routine health system, and track post-operative complication rates. This was done across the three countries and included an additional and even more unique follow-up with patients 6-12 months post-operatively to determine recurrence rates and quality of life changes. Through the dissemination of these findings, the project contributed to resolving the information gap on hydrocele patient surgeries and outcomes. In addition, by sharing insights and experiences gained, the project provided important information for the global community on what is feasible and can be successfully implemented when it comes to providing high-quality hydrocele surgery services across LF-endemic developing countries with different contexts.

As a result of these activities, the project gained valuable insight and experience and made key contributions across three areas: capacity strengthening, improving data availability and use, and filling gaps in the global program knowledge base.

## Capacity Strengthening

The project conducted a wide range of capacity strengthening activities across multiple countries and developed resources for national programs to use to improve the provision of MMDP services. Following is a brief description of the principal contributions of the project to capacity strengthening for trachoma and for LF.

### Trachoma

The project contributed a number of resources and documented best practices based on experience at the country level. Five illustrative examples are described here. Two of the contributions—supportive supervision and infection control—also apply to LF.

**Surgeon trainers’ manual:** The project partnered with experts from the ICTC, the University of North Carolina at Chapel Hill, Johns Hopkins University, Sightsavers, WHO, and others to develop a training guide for TT surgeon trainers (to be used in conjunction with the WHO Trichiasis Surgery for Trachoma manual). This guide, Training Trichiasis Surgeons for Trachoma Elimination Programs, has been endorsed as an ICTC preferred practice and is available in English and in French on the ICTC website. The manual provides additional detail and information to link existing technical resources for training trichiasis surgeons with the aim of standardizing the training of TT surgeons.

**Photo taking:** Under the leadership of Dr. Emily Gower of the University of North Carolina at Chapel Hill and in collaboration with ministries of health in Burkina Faso and Cameroon, the project engaged in a trachoma operational research initiative in 2018-2019, examining the feasibility of taking digital photos to document TT surgical outcomes and to strengthen practitioners’ surgical skills. The photo taking initiative consisted of piloting photo taking during TT outreach campaigns, routine follow-up, and surgical audits in Burkina Faso and Cameroon. Over the course of the pilot, over 1,000 photos were taken at key time points (i.e., pre-operatively, post-operatively at Day 0 and/or Day 1, and 3-6 months after surgery).

The project found that reviewing photos of an eyelid at these key time points can identify characteristics that reveal information about the quality of surgery and whether there is an increased risk of post-operative complications. Surgeons, technical supervisors, and program managers noted that reviewing these photos together can facilitate discussions between surgeons and technical supervisors on how to strengthen surgical skills. Such discussions can be used as part of a broader quality assurance strategy for TT service provision and can inform refresher trainings. Implementation of the initiative also revealed that although taking photos of high image quality



(with good angle, focus, and lighting) can be challenging in a TT campaign setting, surgeons and key stakeholders find the review of photos useful and support integrating photo taking into campaigns if staff and other resources are available. Throughout the implementation of this initiative, the project shared its experiences with others in the international trachoma community, including at the 2018 and 2019 Trachoma Scientific Informal Workshops (TSIW). The project also developed a photo taking resource package to assist national programs and their partners who wish to implement photo taking as an additional quality assurance and/or training tool (see the *MMDP Project Resource Guide*).

**Supportive supervision:** In addition to providing routine programmatic oversight of all activities, the project continually advocated for the integration of technical supportive supervision into all capacity strengthening and disease management efforts. Building capacity in supportive supervision and supporting training throughout different health system levels—from surgeons and their support staff to health center staff to community-level health workers—leaves in place a reinforced human resource base to enable national programs to continue their work towards the goal of elimination.

Over the five years of implementation the project consistently provided resources and guidance to national program partners and health system staff to support the adoption of supportive supervision principles as an integral part of trachoma and LF elimination programs. In promoting supportive supervision, the project observed that successful integration of supportive supervision into systems and activities requires strong ministry of health (MOH) support as well as significant time and resources. In some settings such as Ethiopia, the project has seen significant uptake of supportive supervision concepts and processes, as evident in the Ethiopian Federal Ministry of Health's (FMOH) launch of its Guidelines for Trachomatous Trichiasis Surgical Service: Supportive Supervision, Surgical Audit, and Outcome Assessment; this document includes several key components initially implemented with support from the MMDP Project and other partners. For LF, in 2016 the FMOH released its Hydrocele Surgical Handbook, which adapts content from the MMDP Project-developed Filaricicle Surgery Training Manual to the Ethiopian context.

For both TT and hydrocele surgery, the project developed forms (e.g., observational checklists) to systematically collect data during supportive supervision. Piloting the forms in Burkina Faso, Cameroon, and Ethiopia demonstrated the need to simplify the tools to prioritize the most essential aspects related to infection control, pre-operative and postoperative procedures, health care waste management, provision of equipment and consumables, and data management. To facilitate a user-friendly process for completing the TT supportive supervision checklists, the project piloted a revised, shorter version of the checklist in Burkina Faso in 2018. The new simplified checklist was well-received by field teams and generated supervision data more quickly and effectively than the original version.

**Procurement calculator for TT surgery:** The project developed and disseminated a procurement calculator for TT surgery, available in English and in French, which calculates the estimated number of pharmaceuticals, equipment, and consumables needed based on the targeted number of TT cases. All estimates in the calculator are based on recommendations from the WHO Yellow Manual and synthesize key procurement needs in a user-friendly worksheet for program planners. Revised in 2019, the calculator incorporates the latest preferred practices, including key infection control components (see the *MMDP Project Resource Guide*).

**Infection control and health care waste management:** The MMDP Project has been at the forefront of promoting safe surgical practices that reduce the risk of infection, with the goal of protecting patients, health care workers, and the community at large. This has been done through the adoption of WHO's standard precautions for infection control and the enforcement of universal guidelines for health care waste management throughout the project. An underlying aspiration was that promoting adherence to the standard precautions would also positively influence other national surgical programs beyond NTDs.

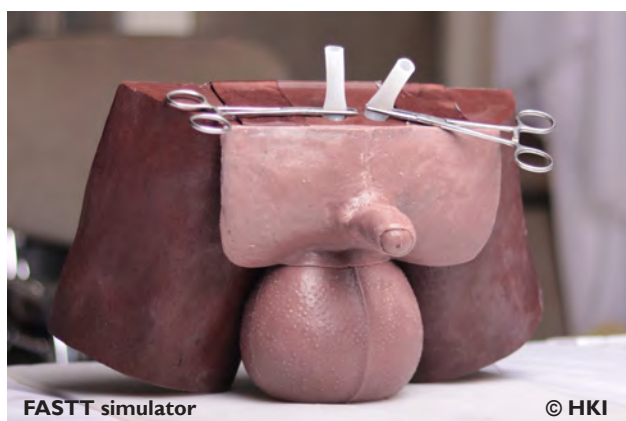
The project was careful to ensure that all guidance and training documents that it produced emphasized infection control and health care waste management protocols by including the required WHO standard precautions as appropriate. For example, the Training Trichiasis Surgeons for Trachoma Elimination Programs manual emphasizes infection control and includes annexes on the individual precautions. The Filaricicle Surgery Training Package also stresses the importance of adopting standard precautions prior to, during, and after surgery. Specific topics on infection control and proper health care waste management were also included in the refresher trainings of TT surgeons. In addition, infection control and health care waste management practices were utilized during the management of hydrocele and TT surgery campaigns. Sharps boxes, trash bags, autoclaves, and equipment for decontamination were used at health facilities and surgery sites. When available, biomedical waste incinerators were used at health facilities, and hydrocele-related waste was incinerated in accordance with WHO protocols for processing of biomedical waste. When incineration equipment was not available, surgeons were responsible for transporting the waste to a site with an incinerator for proper disposal. The MMDP Project routinely monitored adherence to these practices during supervision visits to surgery sites.



## Lymphatic Filariasis

Among the MMDP Project contributions to the global community are a number of manuals, sets of guidelines, and tools, five of which are described below.

**The FASTT simulator:** Working in close collaboration with Dr. Sunny Mante of the African Filariasis Morbidity Project and expert urologists from Burkina Faso (Drs. Adama Guira and Milko Hubert Somé) and Ethiopia (Drs. Messay Molla Mekonen and Denake Beyene Andualem), the project developed a simulator for hydrocele surgery: the Filaricele Anatomical Surgical Task Trainer, also known as FASTT. The surgical simulator is a surgical training tool based on the simulator for trichiasis surgery, HEAD START. It allows surgeons to practice hydrocele surgery using the resection technique on a simulator before performing surgery on a live patient, building their confidence and improving their skills.



The simulator is designed to allow for practice of the resection technique exclusively. This choice of surgical technique was made in consultation with leading international and local urologists and was confirmed in the recently published WHO Surgical Approaches to the Urogenital Manifestations of Lymphatic Filariasis informal consultation report (2019). It should be noted that the project included theoretical teachings in its training packages on one other technique, the eversion technique, which is sometimes used in the case of smaller hydroceles.

FASTT was introduced to those responsible for training surgeons in hydrocele surgery in all three countries in a series of hands-on workshops. Both Burkina Faso and Cameroon proposed adopting the use of the simulator for medical training. Ethiopia went a step further and formally incorporated use of the FASTT simulator into the curriculum of their

medical schools. Going forward, the main constraint to the continued use of the simulator for all three countries is ensuring the availability of the FASTT, including the disposable cartridges that students practice on. In Ethiopia and in Burkina Faso there was strong interest in producing the FASTT simulator locally to ensure a steady, affordable supply for surgical training and refresher courses. To assist in this, the project commissioned a detailed, illustrated manual on how to produce the simulator, the FASTT Simulator: Manufacturing Manual (see the *MMDP Project Resource Guide*).

**Filaricele Surgery Training Package:** Using the experience and lessons learned from the HEAD START training and materials, the project developed a Filaricele Surgery Training Package (initially referred to as the Hydrocele Surgery Training Package) in partnership with the African Filariasis Morbidity Project in 2017. The goal of the training package is to standardize hydrocele surgery practices and ensure that surgical skills and knowledge are in line with global recommendations for optimal surgical outcomes. The package includes a facilitator's guide, slide decks with stepwise training videos, and WHO surgical safety checklists. It provides theory and practice components, including optional use of FASTT, the surgical simulator described above, for the surgeons to practice on before operating on live patients. In 2019 the project updated the original training package to make it more accessible to other members of the surgical team besides the surgeons and to ensure it aligns with the most recent standards of hydrocele care. At that time it was renamed the Filaricele Surgery Training Package.

It should be noted that in consultation with leading urologists and USAID, the inclusion/exclusion criteria for surgery that were included in the Filaricele Surgery Training Package and other related project materials were adjusted to include the provision of hernia repair when present in confirmed hydrocele patients. So although hernia patients were excluded from project-supported service provision, those who presented with co-existing hernia/hydrocele were included.

**WHO LF MMDP Toolkit:** The project collaborated with WHO and the Centers for Disease Control and Prevention (CDC) to refine and finalize the WHO LF MMDP Toolkit to guide countries in developing their morbidity management programming for LF. The toolkit is a collection of tools and templates intended to help countries plan for, implement, and report on implementation and delivery of health care services for LF morbidity management activities. It provides guidance to countries and health care professionals on what constitutes the minimum package of care for LF patients, how to provide it, and how to report on it; evidence of the availability of this minimum package is a requirement for the LF elimination dossier.

The project directly assisted this effort to complete the toolkit by hiring a curriculum specialist to review components of the kit and update it to ensure clarity and consistency. The project also hired a medical illustrator who worked with experts to provide high quality, accurate illustrations for the toolkit. The toolkit has been finalized and is awaiting WHO clearance.

**Procurement calculators for hydrocele surgery and lymphedema management:** The MMDP Project developed and disseminated English and French versions of procurement calculators for program staff to use when planning hydrocele surgery and lymphedema management services. The calculators are Excel spreadsheets with embedded formulas that estimate the necessary amount of supplies for each type of service based on expected number of patients. The calculators were initially developed in 2017 and then updated in 2019 to incorporate the latest global preferred practices. The lymphedema management and hydrocele surgery calculators have been added to the list of references included as part of the slide deck used in WHO's Regional LF MMDP Training sessions and in the WHO Surgical Approaches to the Urogenital Manifestations of Lymphatic Filariasis informal consultation report.

**Development of the WHO LF MMDP Training Package:** The project also supported a range of activities focusing on longer-term sustainability of LF morbidity management in project countries and beyond. In 2017, for example, the project worked closely with WHO and partners to finalize the LF MMDP Training Package, which had initially been developed for training national LF focal points and other national program staff in the South East Asia Regional Office. The project, in close collaboration with WHO, CDC, the Global Alliance to Eliminate Lymphatic Filariasis (GAELF), and others, adapted the package for use in the 2017 training workshop that it organized for Anglophone African countries. At this workshop the project partnered with WHO, ESPEN, CDC, and GAELF to facilitate discussions designed to strengthen participating countries in their LF technical capacities and in preparing a plan for LF elimination dossier submission to WHO. As a result of close collaboration with WHO, the workshop provided an opportunity to update the WHO LF database, and for participating countries to discuss their data-sharing practices and get immediate constructive feedback.

In 2018 the project supported ESPEN and their partners in the organization and facilitation of a similar regional LF MMDP Training Workshop for Francophone Africa, providing another opportunity to further develop the WHO LF MMDP Training Package, including translating the modules into French for wider applicability. In the months following the workshop, the project worked closely with all partners to finalize the training package in English and French, develop a facilitator's guide that would be a companion to the WHO LF MMDP Training Package, and create an additional module focused on the integration of LF MMDP activities into national public health systems. These materials were submitted in English and in French to WHO for final review and clearance.

## Improving Data Availability and Use

Implementation of TT-only surveys, including collaboration with WHO to conduct a pilot TT-only survey, was a key aspect of the project's contributions to improving data availability and use within trachoma elimination programs. For LF, the project's work included testing and implementing various global program tools and resources designed to improve data availability and use, with a focus on obtaining data needed for elimination dossier completion.

**TT-only survey pilot:** As part of the global effort to refine trichiasis burden estimates to aid countries in planning service provision and progressing towards elimination, the MMDP Project collaborated with WHO, the London School of Hygiene and Tropical Medicine (LSHTM), and other partners to support development of a TT-only survey protocol. Since trachoma baseline mapping and impact surveys are designed and powered to determine the prevalence of active disease—resulting in uncertainty about the quality of data that is gathered during these surveys on the trichiasis burden—a TT-only survey protocol was developed to address the need for trichiasis-specific assessments. The project was one of several partners to pilot the TT-only survey methodology during its development. In September-October 2016 the project facilitated the implementation of a pilot TT-only survey in Cameroon (Touboro district), the results of which were used to help refine the survey methodology and shape future surveys. TT-only surveys (and associated trainings of survey team staff) have since taken place in five districts in Cameroon and two districts in Burkina Faso with the MMDP Project's support. TT-only surveys are particularly useful in settings in which active disease is not, or is no longer, at the WHO threshold for intervention and no additional impact or surveillance surveys are planned.

**LF patient estimations:** Before beginning LF disease management activities in Burkina Faso, Cameroon, and Ethiopia, in 2016-2017 the project conducted assessments of LF morbidity. The LF morbidity assessments explored and piloted various methods for estimating the number of individuals with hydrocele and the number of individuals with lymphedema. These methods included integrating burden assessment questions into existing survey platforms (such as transmission assessment surveys), deploying trained workers to conduct door-to-door household visits in communities, and compiling existing patient data collected by health facilities.

**Situation analysis tools and Direct Inspection Protocols (DIPs):** To help countries assess their existing LF treatment and management capacity, all three countries piloted the WHO LF MMDP Toolkit situation analysis tool and draft DIP questionnaires to assess hydrocele and/or lymphedema services at select facilities. Additional piloting of the DIP took place in Vietnam in 2016 with MMDP Project support, with RTI leading implementation and CDC providing technical support.

The situation analysis tool received further testing in late 2016 when the project provided technical support in collaboration with CDC to conduct a situation analysis in Haiti. The project subsequently shared the results of all these activities with countries' respective ministries of health and partners to inform national strategic plans for LF MMDP services and assist countries in preparing their LF elimination dossiers. In addition, the results of these experiences were shared with WHO to inform its finalization of the LF MMDP Toolkit and with USAID as part of ongoing efforts to document lessons learned from USAID's investment in LF morbidity around the world.

## Filling Gaps in the Global Program Knowledge Base

**Surgical management of post-operative TT (PTT):** Current surgical management of PTT is inadequate, with over 40% of eyelids developing a second occurrence of TT within six months after surgery.<sup>1</sup> WHO and global trachoma experts have recognized the urgent need to identify better practices for managing PTT. In response to this need, the University of North Carolina is implementing a clinical trial in Ethiopia to investigate whether performing repeat trichiasis surgery with a new procedure, the bevel/rotate/advance procedure, reduces the rate of post-operative trichiasis by at least 30 percent compared to the Trabut procedure, which has been the standard method. The MMDP Project contributed to this study by supporting 200 of the 700 cases who received surgery as part of the trial.

**Rapid assessment of lymphedema management services:** Through RTI and in partnership with a local Ethiopian NGO—the National Podoconiosis Action Network (NaPAN)—the project conducted a rapid assessment in select districts in Ethiopia. To best determine how to improve lymphedema management service delivery, the project assessed two service delivery methods: a basic package of care or “non-intensified” model and an “intensified” model. The non-intensified intervention consisted only of training for clinical workers on how to teach patients self-care for their lymphedema. In the intensified model, clinical workers received training and supportive supervision visits; in addition washing kits were provided to patients. Findings from the assessment showed that most clinical workers in both models retained information on the causes, complications, and consequences of lymphedema, though those in the intensified arm had a better understanding. In general, understanding about self-care in the non-intensified woredas was poor: some patients did not realize their condition was manageable; others had sought traditional treatment. While understanding appeared higher in the intensified woredas, patients expressed challenges encountered in maintaining self-care routines. These included the time washing takes, patients' inability to buy shoes that fit their feet, and not receiving continuous medical supplies. Due to the stigma surrounding this condition, some of the patients did not want to visit the health center for treatment as they would be “exposed” as lymphedema patients.

<sup>1</sup> Rajak SN, Collin JRO, Burton MJ. Trachomatous Trichiasis and its Management in Endemic Countries. *Surv Ophthalmol*. 2012;57(2):105-135. doi:10.1016/j.survophthal.2011.08.002







## Overview of Achievements by Intermediate Result

The MMDP Project’s goal was to strengthen national ownership and capacity within select African countries to scale up the provision of quality services for the management of morbidity and to prevent disability and disfigurement related to trachoma and LF. Provision of these services as needed is a requirement for meeting trachoma and LF elimination targets. Over its five years of implementation, the project worked closely with ministries of health in Burkina Faso, Cameroon, and Ethiopia to develop a stronger human resource pool, facilitate access to high quality trainings, promote the adoption of internationally recognized preferred practices, scale up MMDP implementation, and strengthen data systems. A cornerstone of the project was to contribute to the development of preferred practices and provide leadership and support to the global MMDP community.

To achieve this, the project focused on four IRs, described below. When developing specific indicators for each IR, the project identified accompanying targets for those indicators linked to existing epidemiological data. This primarily involved setting targets for disease management services and trainings. Disease management targets (e.g., number of surgeries) were set based on the latest trachoma survey results or LF patient estimations. Training targets were based on the number of TT or LF cases planned to receive services and on current national program human resource capacity. As described in the *Challenges and Lessons Learned* section, the epidemiological data upon which targets were based did not always align with on-the-ground observations during implementation, particularly with TT case finding. This sometimes resulted in lower numbers of surgeries provided or staff trained than initially targeted.

Project highlights related to each IR are summarized in Table I at the end of this section. For more detailed data tables summarizing key project indicators by country and fiscal year, see *Appendix A: MMDP Project Summary Data Tables*.

### IR 1: Strengthened MMDP data availability and quality for decision-making at the country level

Ongoing data collection through surveys, burden assessments, situation analyses, and planning exercises in close collaboration with ministries of health provided the MMDP Project with the evidence needed for program planning and establishing targets to help reach disease elimination. To promote the use of epidemiological data in decision-making, the project helped to develop a TT-only survey protocol and training guide and ensured that materials were available in English and French for pilot countries (see *Key Global Contributions* section). In addition, the project consistently advocated for and supported adoption of age- and sex-standardized TT data. Using age- and sex-standardized data is an important factor in ensuring that burden estimates are more accurate and therefore more reliable for program planning. The project’s support of and participation in trachoma action plan (TAP) development meetings in each country also helped to further ensure that data were discussed and incorporated into program planning processes.

To improve knowledge and decision-making around LF management, the MMDP Project piloted new methodologies for assessing disease burden. These initiatives were used to inform the pilot implementation of an LF situation analysis and a separate assessment, using the DIP, of the capacity of health centers to provide LF services.

Additionally, the project collaborated with ministries of health to develop standardized and comprehensive data collection tools and establish clear data flow and reporting structures. Project support also included training ministry staff in MMDP data management. This operationalization of MMDP data management systems generated key MMDP data that the three countries are incorporating into their existing health information systems and using as they progress toward elimination (see the *Monitoring, Evaluation and Learning* section for additional details).

### Data Management Improvements

An important contribution of the project was to assist ministries to reinforce their MMDP data management systems. Incorporating MMDP data into existing health information systems improved planning, facilitated course corrections, and is generating data required for preparing the elimination dossiers for trachoma and LF.

## **IR 2. Strengthened support for MMDP implementation scale-up and quality improvement at the country level**

In all three countries, the project worked with ministries of health to support increased service provision for TT and LF disease management at the community level. To achieve elimination of trachoma and LF, countries will have to demonstrate through prevalence surveys that TT is below 0.2% among the adult population and show that they have the capacity to deliver a minimum package of care to all people affected by LF morbidity (both for hydrocele and for management of lymphedema). Since service provision is a critical component for the completion of elimination dossiers for both trachoma and LF, it represented a sizeable part of the project's implementation efforts.

TT surgeries took place through multiple operational platforms, including outreach campaigns, dedicated mobile teams, and static site services. Strategic planning of these outreach efforts prioritized areas of intervention using the latest available epidemiological data. Outreach included extensive TT case finding involving social mobilization activities and often door-to-door screening. Close monitoring of each district's TT campaign activities at the more granular health area, woreda, and/or village level enabled wide geographic coverage of service delivery.

For LF, provision of hydrocele surgery took place with project support through outreach camps and as part of the routine health system. The project also supported the organization of case finding and case confirmation activities prior to providing hydrocele surgeries and conducted a series of trainings on hydrocele surgery in an effort to standardize the quality of care and ensure adherence to the latest global recommendations. Lymphedema patients, along with their caregivers and community members, received training in lymphedema management concepts and processes. This scale-up of disease management services increased overall MMDP implementation at the country level in Burkina Faso, Cameroon, and Ethiopia.

The project also prioritized quality improvement as an integral component of its strategy for supporting MMDP implementation. Training and supervision of various cadres involved in TT surgery, hydrocele surgery, and lymphedema management constituted the project's primary means of strengthening the human resource pool for LF MMDP and TT management implementation. To promote high-quality implementation, these trainings took place in accordance with international preferred practices and WHO standards for TT and hydrocele surgery. The TT surgeons trained were evaluated and certified according to WHO standards if they demonstrated proficiency. Trainings also prepared those involved in TT and hydrocele surgery to conduct supportive supervision, patient counseling, and patient follow-up in line with preferred practices. Also essential for quality improvement was the project's systematic incorporation of supportive supervision, follow-up of operated cases, and analysis of TT and hydrocele surgical quality data as part of ongoing monitoring; these data were also used to identify additional training needs.

## **IR 3. Strengthened capacity of MMDP systems within ministries of health**

National ownership of planning, implementation, and M&E for MMDP activities was critical to ensuring that MMDP Project efforts were well-coordinated with other partners in the country and that improvements initiated during the project would be sustained. With key actors from ministries of health leading these processes, the project's valuable support role consisted of ensuring that national programs had access to the tools and materials, cadres of trained surgeons, technical support, and coordination mechanisms that were needed for strengthened provision of MMDP services. To this end, the project worked with countries to develop and implement multiple mechanisms designed to strengthen health systems to ensure quality MMDP services. A key mechanism was engaging in strategic planning meetings at the national and regional levels, with district-level representation as needed. This regular participation of MOH staff in MMDP planning, implementation, and supervision provided the opportunity for national ownership of activity implementation timelines, coordination across different levels of the health system, and feedback loops to monitor and improve activities from the national level down to the operational level.

Other capacity strengthening mechanisms included providing health staff, particularly surgeons, with access to preferred practices and WHO guidelines in surgeon training; supporting TT and hydrocele surgery post-operative follow-up; forecasting and distributing pharmaceutical, consumable, and durable good needs for service provision; and systematically documenting TT surgery refusals and referrals. Environmental mitigation and monitoring was another critical part of project activities to mitigate risks related to infection control and environmental harm. Protection of surgeons, patients, and communities relies on adherence to infection control

measures and proper disposal of biological waste, sharps, and other items used during surgery. Regular submission of environmental mitigation and monitoring reports throughout the life of the project provided a process for monitoring and addressing environmental risks. With these innovations laying the groundwork for sustaining disease elimination gains over time, national programs were equipped with the knowledge and experience needed to continue implementing these mechanisms after the end of the project.

#### **IR 4. Provision of global leadership through building upon the knowledge and evidence base for MMDP preferred practices and policy**

Overall, the project's role as the USAID flagship project for MMDP brought technical, programmatic, and operational leadership to the MMDP community, furthering the global programs in their support of elimination of trachoma and LF as public health problems in endemic countries. The project engaged with global partners, including WHO and CDC, to develop and refine tools and resources for trachoma and LF. These tools and resources include the FASTT surgical simulator and the Filariciele Surgery Training Package; the Training Trichiasis Surgeons for Trachoma Elimination Programs manual (accepted as an ICTC preferred practice); procurement calculators for trichiasis surgery, hydrocele surgery, and lymphedema management; a set of lymphedema management training videos with an accompanying trainer's guide; the WHO LF MMDP Toolkit; the WHO LF MMDP Training Package and trainer's guide; and the Photographing Eyelids Before and After Trachomatous Trichiasis (TT) Surgery resource package. For a list of project-supported tools, resources, and information products—including how to access these materials—see the *MMDP Project Resource Guide*. Systematic sharing of MMDP preferred practices, tools, and lessons learned from the country level contributed to the global MMDP community's growth and development and allows for sharing resources and experiences across countries and partners even after the project's close.

Supporting and participating in MMDP coordination meetings within the trachoma and LF communities was another important aspect of the project's global leadership role. In trachoma, for example, the project supported WHO and partners in convening the Global Trichiasis Scientific Meeting in Cape Town in 2015, which provided the opportunity to refine and disseminate TT technical guidance for all endemic countries. For LF, the project served as the secretariat of the LF community's WHO-led Monthly Morbidity Management Meetings from 2015 to 2019. Throughout the project, five webinars spanning a range of trachoma and LF topics provided state-of-the-art technical and programmatic updates for members of the USAID NTD portfolio, national programs, and other interested stakeholders. These webinars often focused on disseminating new or updated tools and resources, many of which the project helped develop.


International meetings provided another valuable opportunity for the project to collaborate and coordinate with external partners. Project staff regularly attended and often delivered presentations, facilitated sessions, or presented posters at meetings of the NNN, ASTMH, GAELF, COR-NTD, GET2020, ICTC, and TSIW. MMDP Project presence at these meetings fostered cross-country and cross-organization learning as well as dissemination of MMDP preferred practices, documentation, and tools.

Finally, as described in the *Key Global Contributions* section, the project supported two trachoma operational research initiatives in collaboration with ministries of health and its Senior Scientific Advisor, Dr. Emily Gower: i) use of photo taking to predict TT surgical outcomes and potentially serve as a capacity strengthening tool for surgeons; and ii) research of a promising new technique for post-operative TT surgery developed by Johns Hopkins University. These two research activities contributed to filling existing gaps in global knowledge related to TT and post-operative TT management interventions.



Table 1. Key Project Achievements by Intermediate Result

Intermediate Result	Key Achievements with MMDP Project Support
IR 1: Strengthened MMDP data availability and quality for decision-making at the country level.	LF MMDP situation analysis conducted in four countries (in select regions)
	Over 200 districts where hydrocele and lymphedema patient estimates are available as a result of MMDP Project support
	Generation of new TT data through seven TT-only surveys
	TAP meetings and elimination dossier planning workshops conducted
IR 2: Strengthened support for MMDP implementation scale-up and quality improvement at the country level.	Training of 37 TT surgery national trainers, 281 TT surgeons (including 59 receiving refresher trainings), and 113 TT supervisors
	100% of TT surgeon trainings conducted with HEAD START, with 88% of newly trained surgeons certified according to WHO guidelines
	642 TT surgery campaign managers and 17,395 TT case finders and/or community mobilizers trained
	2,188,829 people examined for TT, of whom 78,387 were confirmed to have TT
	71,735 people provided TT surgery and post-operative follow-up; 2,473 people referred to a higher-level health facility; and 3,211 surgery refusal cases made known to the health system
	Training of 27 hydrocele surgery national trainers, 212 hydrocele surgeons, and 426 hydrocele surgery support staff
	2,100 people provided hydrocele surgery and post-operative follow-up
	2,166 health staff and community members trained in lymphedema management
	2,185 lymphedema cases trained in self-care
	92% of people assessed for complications within 5 days of hydrocele surgery
	32 health facilities providing hydrocele surgery assessed for quality
	91 health facilities providing care for lymphedema assessed for quality
IR 3: Strengthened capacity of MMDP systems within ministries of health.	Regular annual MMDP review and planning meetings with representatives from multiple administrative levels of the health system
	Distribution of 1,305 TT kits, 34 HEAD START surgical simulators, and 6,447 HEAD START cartridges to national programs
	48 facilities provided with consumables for hydrocele surgery
	2,352 washing kits for lymphedema management distributed
IR 4: Provision of global leadership through building upon the knowledge and evidence base for MMDP preferred practices and policy.	7 trachoma resources developed with MMDP Project support, including the acceptance of the <i>Training Trichiasis Surgeons for Trachoma Elimination Programs</i> manual as an ICTC preferred practice
	8 LF resources and updates to multiple components of the WHO LF MMDP Toolkit developed with MMDP Project support
	Support of two trachoma operational research initiatives: 1) photo taking to predict TT surgical outcomes and inform surgeon training and 2) research of a promising new technique for post-operative TT surgery



*"... You feel proud to help someone recover because if you suffer from [trichiasis] it is uncomfortable and painful. But once you have the surgery, your health improves. Then you can work again without problems. So, it makes [me] proud to have saved someone's sight." - Minanta, Burkina Faso surgeon*



# Key Achievements in Burkina Faso

## Trachoma

### Country Overview

In 2006, Burkina Faso began implementing its national integrated NTD program through the USAID-funded NTD Control Program managed by RTI. By the start of the MMDP Project in 2015, trachoma MDA had reached national scale, resulting in significant progress in interrupting disease transmission. In contrast, little progress had been made in addressing morbidity related to the disease. While small scale, sporadic investments had been made over the years, there was still a need for significant investment in morbidity management in order to reach trachoma elimination targets. At the launch of the MMDP Project, the estimated number of people needing TT management in Burkina Faso to attain the elimination threshold was approximately 35,000, though these data had not yet been standardized by age and sex. Roughly one-third of this national burden was estimated to exist in the regions of Center North and Hauts-Bassins, neither of which had received any support for trachoma elimination from any partner. The project therefore focused its efforts in these two regions and made considerable progress in bringing both regions closer to their elimination targets through a multifaceted model of coupling the delivery of TT management services with key health systems strengthening initiatives.

The project supported a total of 1,933 TT surgeries in the two regions. In the Center North region, the project supported all four districts requiring provision of intensive TT management services. Campaigns in Boussouma and Barsalogho addressed nearly the entire theoretical elimination target in those districts, with additional campaigns addressing 86% of the latest elimination target in Kaya and 32% in Kongoussi. In Hauts-Bassins, project-supported campaigns addressed 80% of the latest elimination target collectively remaining in the three districts of Dafra, N'dorola, and Orodara. Additional campaigns in Dande and Do took place in 2017 and addressed a small proportion of the theoretical elimination targets in those two districts, which later dropped below the TT elimination threshold when re-surveyed and therefore no longer required intensive TT management services. Figures 1 and 2 below illustrate these changes in the estimated remaining elimination target over the course of the project.

In addition to providing intensive TT management services, by focusing on ensuring quality surgical outcomes through improved training approaches, introducing HEAD START, and certifying TT surgeons according to WHO recommendations, the project leaves behind a pool of 15 certified TT surgeons (from 30 surgeons trained) that will be critical for identifying and managing remaining TT cases. The project's supportive supervision of surgical teams and promotion of high standards of infection control and health care waste management were also major points of emphasis and form a foundation of knowledge and experience that Burkina Faso's National Neglected Tropical Disease Control Program (PNMTN) can continue to draw upon long after the project.



© Bradley Cox



Figure 1: Estimated Remaining Elimination Target at the Start of the MMDP Project, Burkina Faso

Note: All maps in this report only reflect data that have been shared with the MMDP Project. Additional data may be available through ministries of health. Map health district (HD) or woreda counts are based on the latest shape files made available to the project and may not always reflect the latest redistricting in a country.

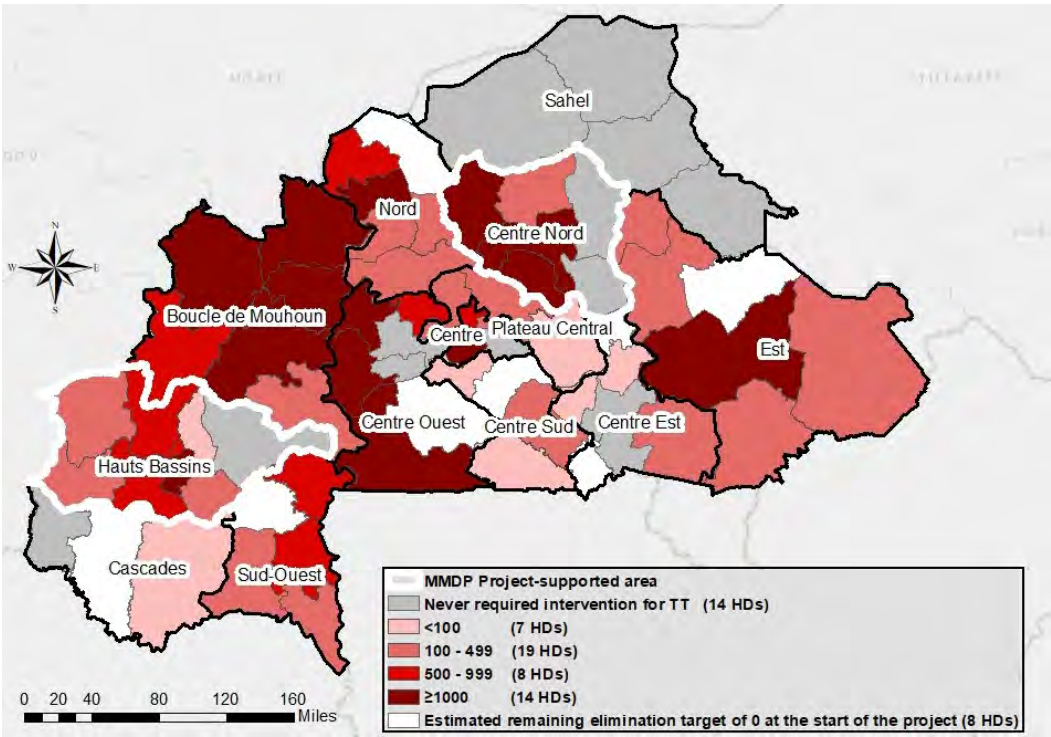
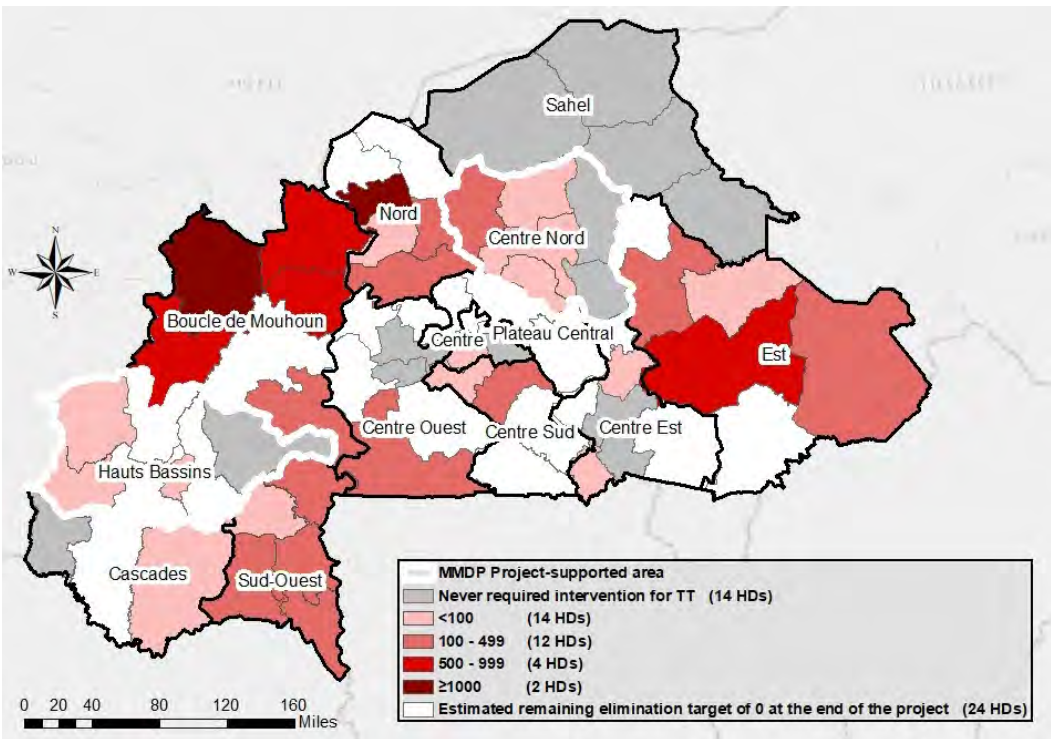


Figure 2: Estimated Remaining Elimination Target at the End of the MMDP Project (as of June 2019), Burkina Faso



### Key Achievements



### TT Campaigns

In Burkina Faso, the MMDP Project organized TT campaigns at the village level with case finding activities and surgeries taking place on the same day to enable staff to maximize transportation costs and their time in each village. All campaigns were preceded by strategic planning, social mobilization and behavior change activities, and advocacy to ensure the support of local leaders, raise awareness of trachoma, inform communities of the services available through the project, and motivate people to seek surgery.

For efficiency, advocacy activities were conducted for both TT and LF at the same time and included a series of advocacy days that were used to present an overview of the activities planned in each district. Topics included trachoma and LF clinical manifestations, disease management, and modes of transmission. Participants included political, traditional, administrative, municipal, and religious leaders and also civil society actors. In districts targeted for TT management services, the project shared information on TT campaigns. In districts receiving support for LF, the project emphasized hydrocele surgery and lymphedema management training. Working closely with leaders in each community helped to ensure that community members participated in project activities.

For the community-level social mobilization activities, the project used radio messages, public criers, and the distribution of information, education, and communication (IEC) materials. Prior to and during campaigns, local radio stations broadcast information in French and local languages about trachoma and the project's activities. Public criers delivered information at the village level about trachoma and program activities including surgery dates, availability of screening services, and the source of funding for surgeries. The project also distributed posters, leaflets, and brochures on trachoma, symptoms of TT, and trichiasis surgery.

Each TT surgery campaign lasted approximately ten days. A surgery location was assigned at either a Health and Social Promotion Center (CSPS) or a school in the village. Cases were identified using two methods. The first involved screening by community-based health workers (CBHWs) and local health facility workers as part of their routine activities, with these cases later confirmed by surgeons during the campaigns. The second method involved door-to-door case finding. Screeners (TT surgeons), accompanied by

CBHWs serving as guides and interpreters, would examine individuals in their homes. Screeners also confirmed suspected cases that members of the community and CBHWs had previously identified. Once cases were identified, they were directed to the surgery site for appropriate treatment. People with lower eyelid TT, children under 15 years old, and post-operative TT cases were referred to a higher-level facility.

Surgeries, using the Trabut method, were conducted for all individuals who consented. The operating surgeon conducted post-operative monitoring for all individuals on Day 1, when the bandage was removed and the operation assessed. During this appointment the patient was informed of the next post-operative appointment on Day 7. The second follow-up was conducted by the CSPS health worker who examined the individuals and removed the sutures. Monitoring of operated cases also took place at 3-6 months post-surgery. Individuals who did not accept surgery were offered epilation. However, they did not receive forceps to continue epilation at home per the current guidelines from the PNMTN. All cases of refusal were registered within the health system to receive follow-up from a local nurse at a later date.

Overall, in Burkina Faso the project examined a total of 229,936 people (63% women), of which 2,497 individuals were confirmed to have trichiasis. Of these confirmed cases, 1,933 people received trichiasis surgery (79% women), 117 people refused surgery, and 225 were referred to a higher-level facility for surgery (due to lower eyelid or post-operative trichiasis). Among the nine districts where the project supported surgeries, four districts achieved 100% coverage of their health areas. The other five districts covered between 68% and 90% of their health areas, as expected, due to their larger size. A total of 232 health areas were included in the project's provision of trichiasis management services.

### Capacity Building

Project start-up planning in Burkina Faso identified a need to increase awareness and uptake of preferred practices for TT surgery (such as use of the HEAD START surgical simulator for training TT surgeons). Capacity building activities therefore prioritized training national trainers who could train additional TT surgeons in these preferred practices. These national trainers also received training in supportive supervision, as regular technical supportive supervision of TT surgeons during TT management activities in the field is a key factor in ensuring the quality of surgeries performed. However, human resource constraints placed a significant time demand on a small pool of technical staff who are needed to provide TT surgery, conduct technical supervision of surgeries, and/or participate in post-operative follow-up. The project responded to this challenge by training additional surgeons as technical supervisors, and by having these technical supervisors play a “double role” of both operating and supervising during those campaigns that had more limited staffing.

Technical supervisors were trained and certified with support from Dr. Amir Bedri Kello (international TT surgery and HEAD START master trainer). Due to the small pool of candidates available at the national level, the competing priorities of both the candidates and the national program, and the limited availability of Dr. Kello, organizing these trainings often proved difficult. Nevertheless, the project was able to train 12 new technical supervisors. After the trainings, the technical supervisors received a checklist, which they used during TT surgery campaigns to ensure that all social mobilization activities, case finding, counselling, surgery site organization, and actual surgeries were completed in line with preferred practices.

Initial feedback from technical supervisors showed that the list was too long to be completed effectively during campaigns. As a result, the project developed a revised technical checklist that focused on actions that are considered essential according to the WHO TT surgeon checklist used for surgeon certification. To further improve the process, in 2019 the project started using mobile data collection in order to quickly gather technical supervision data. Supervisors and project staff found that the use of mobile data collection greatly facilitated the supervision process. This was particularly beneficial during campaigns when both technical supervisors and HKI staff had many competing tasks. In addition, since the reporting burden was lighter, supervisors were more motivated to complete the checklist.

To increase the pool of surgeons available for campaigns, the project trained and certified TT surgeons according to global preferred practices. The trainings, which were led by national trainers previously trained by Dr. Kello, included theoretical components on surgical management of TT, infection prevention measures, counselling techniques, data collection and analysis, referral of non-TT cases, management of drugs and consumables, practice using the HEAD START surgical simulator, and practical sessions on TT cases. Surgeons who made it to the final phase of the training were certified and retained for project-supported activities. The project also periodically organized refresher trainings for certified surgeons to ensure knowledge and skills retention.



Project capacity building activities also included trainings for other groups that play important roles in the provision of high-quality trichiasis management services including regional- and district-level MOH representatives, CSPA health workers, CBHWs, and traditional practitioners. These groups participated in training sessions on a wide range of topics including trichiasis identification, trichiasis outreach campaigns, conducting post-operative follow-up, infection control, health care waste management, national data collection and synthesis tools, and supportive supervision techniques. The project also trained members of the Regional Health Directorates (DRS) and district health staff on USAID grant rules and procedures for the management of fixed obligation grants.

**Innovation in surgical training**

An innovation widely appreciated by the Burkina Faso medical community was the introduction of the HEAD START surgical simulator. Use of the simulator and accompanying didactic materials allows medical personnel to perfect their skills on an inanimate object before operating on live patients. This has become a preferred practice in Burkina Faso.

**HEAD START in Burkina Faso**

Another important aspect of the project’s capacity building initiative was the introduction of the HEAD START simulator to the PNMTN and advocacy for its use beyond the project. The culmination of these efforts was a workshop held in April 2019 to introduce the HEAD START simulator to trainers at the country’s National School of Public Health and the Health Sciences Training and Research Unit responsible for training doctors and health assistants in ophthalmology and surgery. This was followed by a donation of HEAD START kits to both those training institutions and the PNMTN. Throughout the course of the project, Burkina Faso’s MOH not only recommended the use of the HEAD START training package to other projects but has also used it to train surgeons in non-project-supported areas.

**TT-only Surveys**

In 2019, the project supported two TT-only surveys in the Hauts-Bassins region in the districts of Orodara and N’dorola, using the Tropical Data platform. The project advocated for the PNMTN to obtain the age- and sex-standardized results from Tropical Data for use in planning future TT management services. These results are needed to determine whether the TT elimination threshold has been met in these two districts following project-supported campaigns.



## Progress Towards Elimination

Burkina Faso has made rapid progress towards meeting elimination criteria for trachoma, particularly with interruption of transmission. MDA ceased after 2016 distributions and multiple impact and surveillance surveys are being implemented or planned throughout the country. While many of these districts have generated survey results showing trachomatous inflammation-follicular (TF) under the elimination threshold, in some areas TT has remained above the elimination threshold—although the age- and sex-standardized TT prevalence rates, which may be lower, are still pending confirmation in many districts. Figures 3 and 4 below show the change in districts above and below the WHO TT elimination threshold over the life of the project. A number of these districts, including districts where the project organized campaigns, are scheduled for future impact and surveillance surveys. However, TT-only surveys are needed in certain areas such as Barsalogo, where a revised TT estimate is needed following project-supported service provision but no future surveys are planned based on the MDA schedule. Planning and coordinating future TT management service provision will require close monitoring of the results from these various trachoma surveys, including confirmation of age- and sex-standardized results.

The most recent survey data made available to the project estimate a remaining 11,675 people with TT requiring management to achieve the TT elimination target. The country will continue to receive USAID funds through the Act to End NTDs | West funding mechanism. These funds will support the needed surveys and any further MDA that may be necessary if districts show a return above the TF threshold of 5.0%. The World Bank is also a partner in Burkina Faso and had planned support for surveillance surveys in 2018. Additionally, Burkina Faso will be one of at least ten countries to receive funding from Accelerate through Sightsavers, enabling the country to continue its efforts toward elimination.

With these funds and the legacy of trained trainers and certified surgeons, the introduction and implementation of the ICTC recommended preferred practices, and the focus on quality that the MMDP Project leaves behind, Burkina Faso is well-positioned to achieve elimination.

Additionally, progress has been made in the preparation of the actual elimination dossier. In May 2019, the MOH, with assistance from the project, conducted a workshop to begin elimination dossier preparation. One of the recommendations from this workshop was to have a first draft of the narrative and data sheets completed by the end of 2019. Part of the elimination dossier and critical to trachoma elimination will be the development of a system to manage those cases below the TT elimination threshold and incident cases. With various cadres of health trained by the project to identify, refer, and manage incident cases, the country is one step closer to that goal.



© William Nsai



Figure 3: Districts Above the WHO Elimination Threshold at the Start of the MMDP Project, Burkina Faso

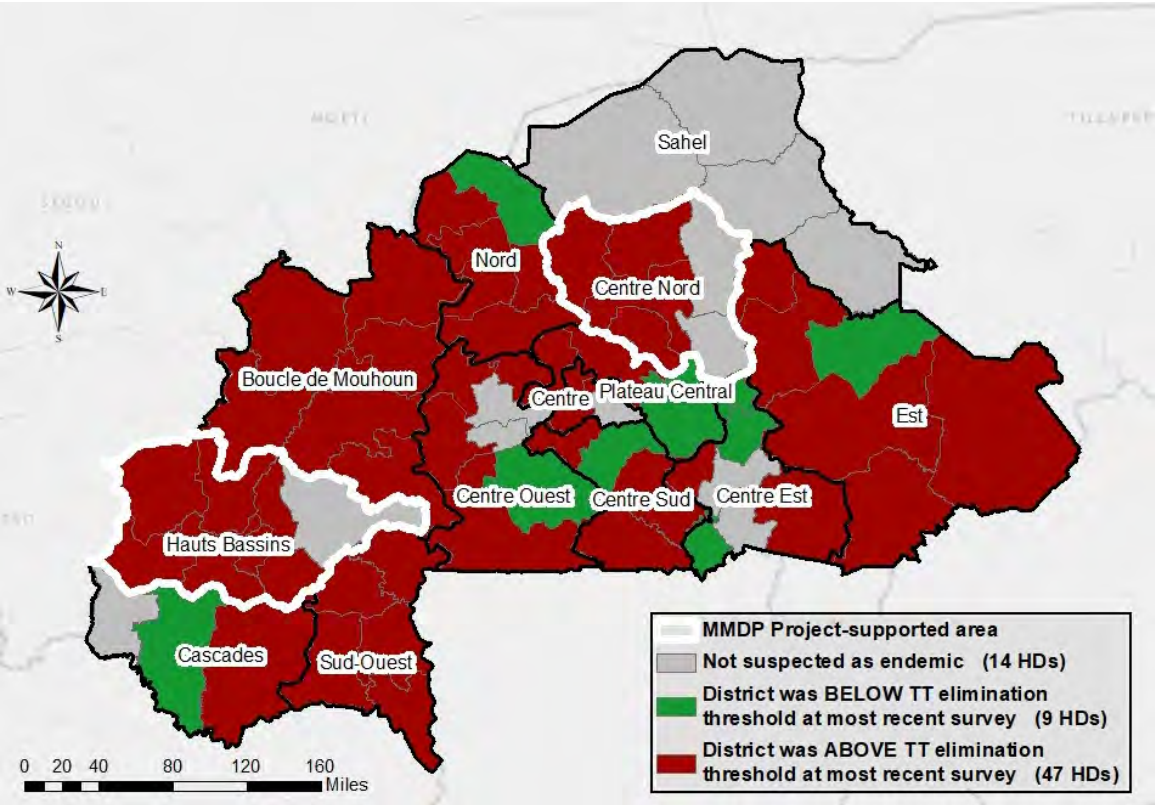
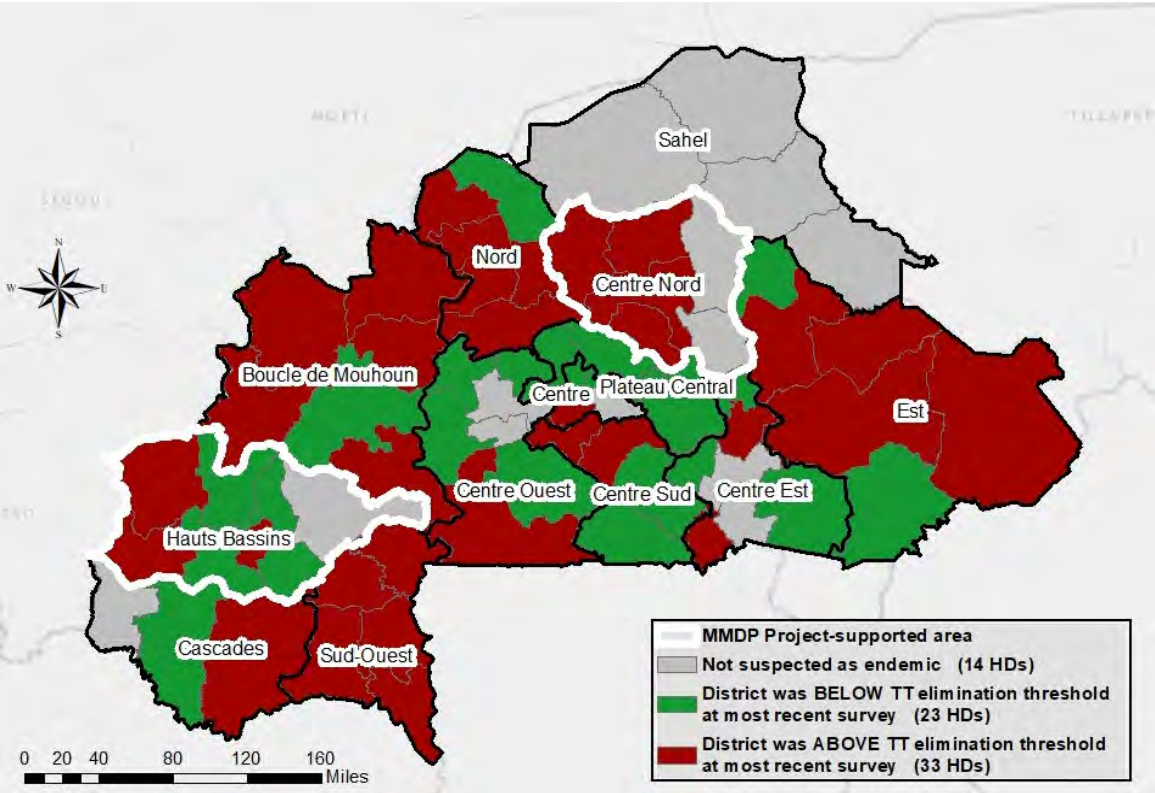


Figure 4: Districts Above the WHO Elimination Threshold at the End of the MMDP Project (as of June 2019), Burkina Faso







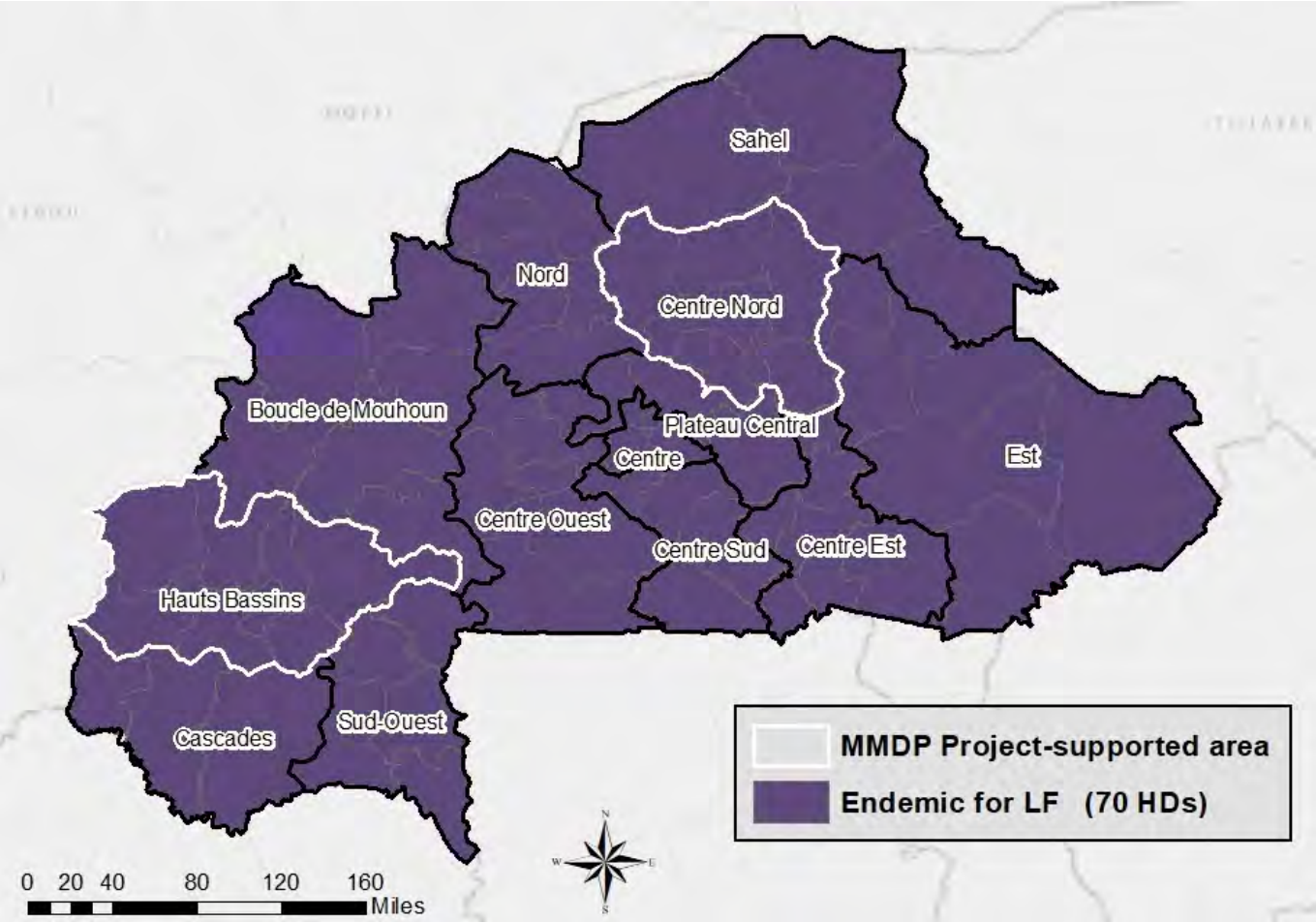


## Lymphatic Filariasis

### Country Overview

LF was found to be endemic in all of Burkina Faso’s districts following the completion of mapping in 2002, as shown in Figure 5 below. Although reliable data regarding LF morbidity was not available, a high morbidity burden was expected given the original high prevalence of LF found in all districts. The MOH’s main partners in LF morbidity were initially Handicap International and HKI, but much of the funding for activities came from the government itself. By 2005, the country had registered roughly 20,000 men with hydrocele and 14,000 people with lymphedema. These data had been collected during MDA activities, though the approach of collecting patient estimates during MDA was ultimately discontinued because funds for service provision for identified cases were not available at the time. The MOH conducted over 3,000 hydrocele surgeries between 2005 and 2015 and trained nearly 8,000 individuals in how to most effectively wash their affected limbs. By 2015, when the MMDP Project began, Burkina Faso was making clear progress toward meeting the public health elimination goals for both interrupting transmission and demonstrating the capacity to manage LF morbidity. However, a major challenge was the lack of a continuous funding stream to maintain service provision for people with hydrocele and lymphedema.

Figure 5: Lymphatic Filariasis (LF) Endemicity (as of 2002), Burkina Faso



As Burkina Faso had clearly made the management of LF morbidity a priority, the introduction of additional funding and technical support from USAID through the MMDP Project was timely and ultimately helped the country come closer to meeting the WHO elimination criteria for morbidity. The project updated LF patient estimations in select districts, conducted high-quality trainings of health staff and patients on lymphedema management and of surgical teams on the provision of standardized quality of care of hydrocele patients, introduced more robust guidelines for infection control and health care waste management, and promoted supportive supervision systems. Moreover, the MOH embraced the introduction of the FASTT surgical simulator for the training of hydrocele surgeons, with Burkina Faso becoming a key setting for demonstrating the utility of FASTT.

The MMDP Project initially used the MOH's estimates from MDA activities to plan LF activities in the two project-supported regions of Center North and Hauts-Bassins. Before beginning disease management activities, the project conducted assessments of select health facilities providing hydrocele and/or lymphedema services, compiled updated lists of LF patient estimations, and supported training of 93 hydrocele surgeons. Over the course of the project, a total of 1,168 hydrocele surgeries took place, representing the majority of the cases identified in the Center North region with project support and all of the cases identified in Hauts-Bassins' targeted districts. Another 678 people with lymphedema received training in self-care.

In addition, the project's capacity building efforts to train 452 health staff and 3,701 community members, including traditional health practitioners, in lymphedema allows for additional knowledge transfer and service provision by these trained individuals beyond the end of the project. Focusing on improving the quality and use of data was also a focus. As a result, the burden data collected will help meet the elimination criteria of having LF patient estimations and, along with information collected during the project's health facility assessments, will help the PNMTN plan for their next steps to provide services (see Figures 6 and 7 below).

Figure 6: Districts with Lymphatic Filariasis (LF) Morbidity Patient Estimations (as of June 2019), Burkina Faso

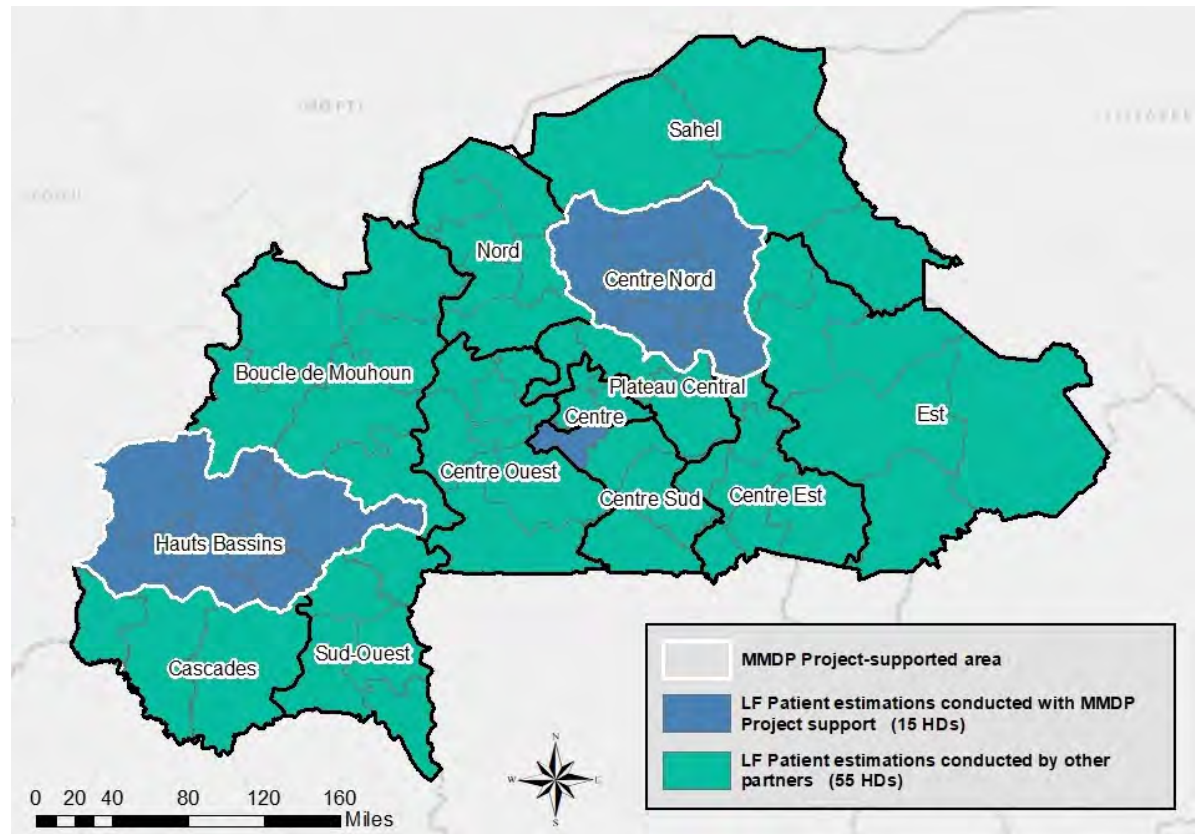
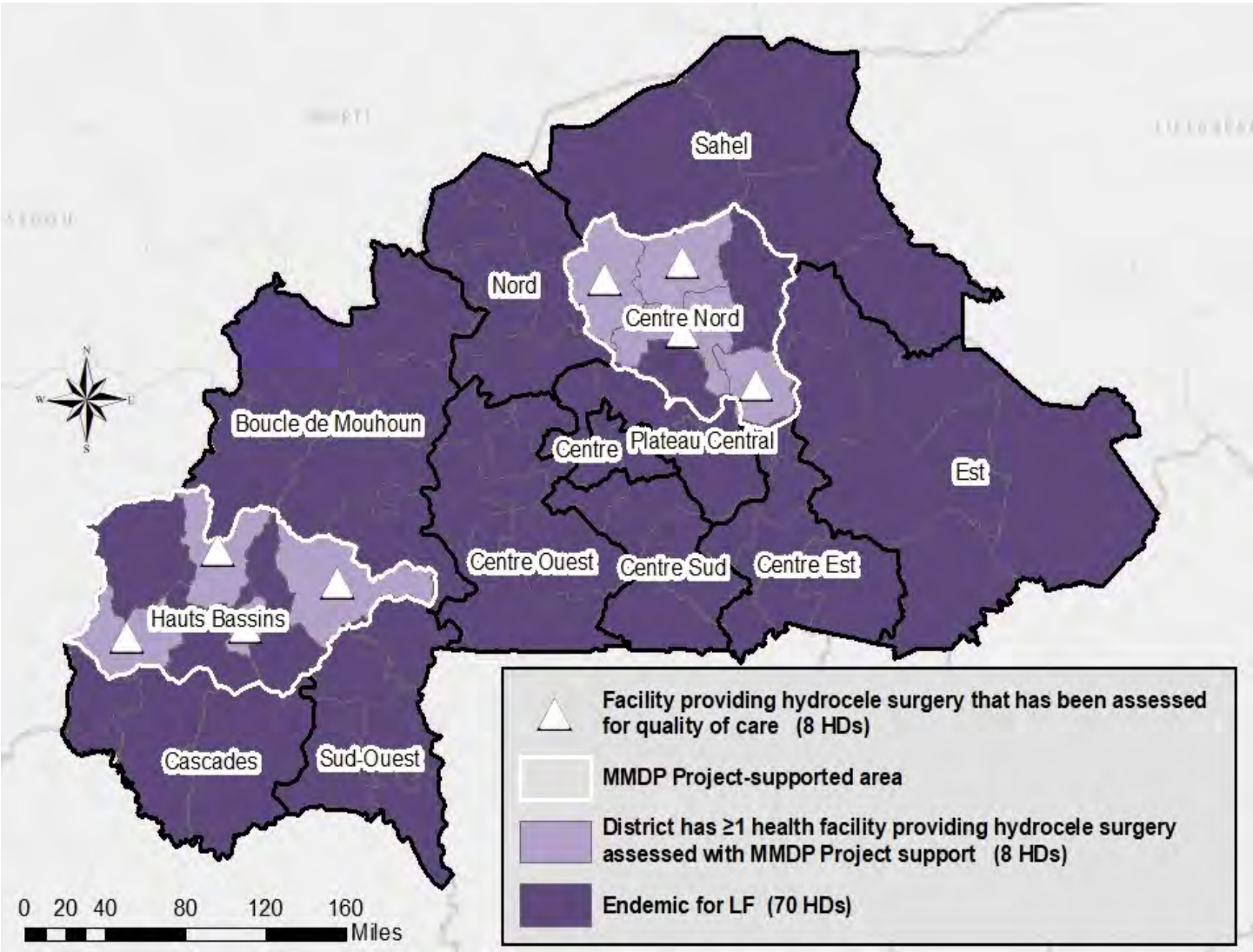
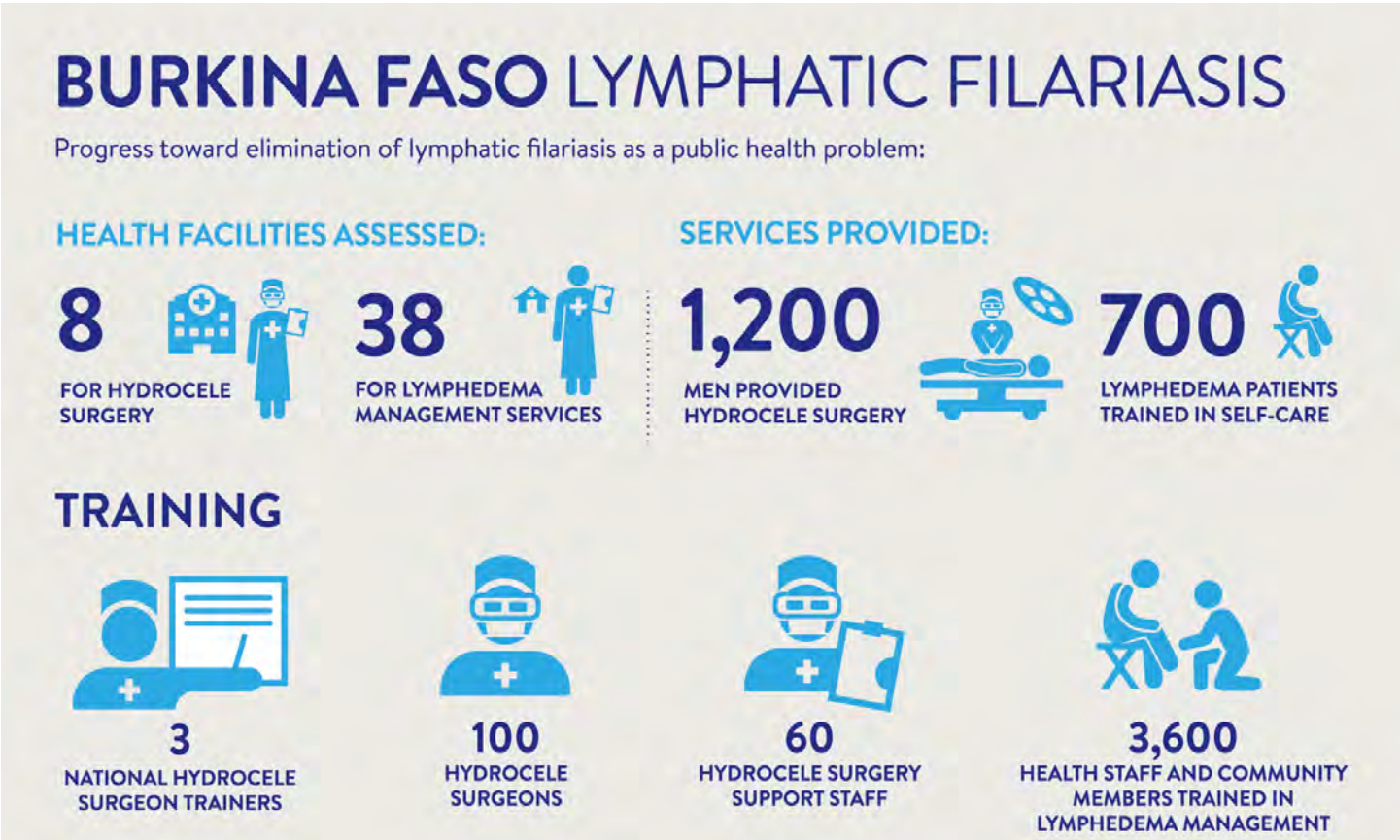




Figure 7: Health Facilities Providing Hydrocele Surgery Assessed for Quality, Burkina Faso



Key Achievements



Situational Analysis and Burden Assessment Activities

Several methods have been used to collect LF burden data in Burkina Faso. The MMDP Project initially used PNMTN estimates to plan LF activities in the two project regions of Center North and Hauts-Bassins. Prior to conducting burden assessment activities and prior to provision of services, the project compiled burden data from health facilities in the targeted districts to actively identify the hydrocele and lymphedema management cases that would receive support.

In July 2016, the project carried out a DIP in the Center North region, with an integrated situation analysis, to assess LF morbidity and LF treatment and management capacity. The analysis involved 18 health facilities providing lymphedema management services and four providing hydrocele surgery. The analysis covered all four facilities providing hydrocele surgery in the region and roughly 11% of the region’s 158 health centers providing lymphedema management services at the time. In 2017, to guide its expansion into the Hauts-Bassins region, the project conducted a situation analysis, integrated with the DIP, in all eight districts in the Hauts-Bassins region. This analysis involved 20 health facilities providing lymphedema management services, representing roughly 11% of the region’s health centers. The project also assessed all four health centers that had the necessary capacity to perform hydrocele surgery.

In 2017, the project collected information regarding lymphedema and hydrocele burden in the Center North and Hauts-Bassins regions. Historically, burden data were collected during MDA campaigns. Since LF MDA had stopped in the project’s targeted districts, MDA campaigns no longer provided a platform for burden data collection. The project therefore sought revised estimates from health centers.

LF burden data on suspected hydrocele and lymphedema cases are routinely captured by the health system at the health center level. Health centers register suspected cases identified by a CBHW at the community level or by health staff when a suspected case self-presents at the health center. The health center then keeps information about these cases on file at the facility but does not systematically transmit the information to other levels of the health system. In MMDP Project-supported districts, project staff

requested these lists from the health centers through the DRS. The suspected cases identified using this approach were considered to be “registered.” In addition, to supplement the hydrocele burden data routinely collected by health centers in targeted districts and to confirm hydrocele cases before surgery, the project worked with health center staff and CBHWs to encourage people with symptoms to go to their nearest health center for examination and confirmation by a surgeon. At times, more people self-reported at the health center than had originally been registered as suspected cases through the routine health system. The project registered 1,078 hydrocele and 791 lymphedema cases in the Center North, and 88 hydrocele and 151 lymphedema cases in Hauts-Bassins.

### Capacity Building

The project’s capacity building activities for LF focused on training operating room team members, including surgeons, on hydrocele surgery and providing “cascade” training in lymphedema management to DRS and district management team members, CSPA health workers, CBHWs, and patients and their caregivers.

For lymphedema management, PNMTN teams and technical experts trained DRS and district management team members in LF grading, clinical manifestations and treatment, psychosocial effects of the morbidities, behavior change communication, and completing data collection tools. The trainers used documents from the WHO LF MMDP Toolkit to conduct these sessions. Next, the project trained CSPA health workers in lymphedema management. Their training included the same topics covered with the DRS and district management team members as well as a demonstration and practice of washing the affected limb. In the final tier of lymphedema training, the project included CBHWs, individuals with lymphedema, and caregivers in lymphedema management training. These sessions also used documents from the WHO LF MMDP Toolkit that were adapted to the setting in Burkina Faso, including a patient brochure on washing and materials designed for training community health workers to identify lymphedema/hydrocele and treat lymphedema patients. In the Center North region, the project trained 514 patients and 1,978 community members and CBHWs in lymphedema. In the Hauts-Bassins region, 164 patients and 1,189 community members and CBHWs received training.

For hydrocele surgery, the project trained three national hydrocele surgeon trainers and 93 hydrocele surgeons using the Filaricele Surgery Training Package developed by the MMDP Project. In most instances, the training included practice with the FASTT simulator. With support from project staff and the PNMTN, the national trainers led the trainings for hydrocele surgeons and support staff. Anesthetists, pharmacy staff, laboratory staff, post-surgical nurses, and orderlies were trained to provide support during and after hydrocele surgery. The hydrocele surgeon training included three phases, the first of which involved theoretical training on strategies to eliminate LF, clinical manifestations of LF and treatment, the psychosocial impact of the disease, and infection control preferred practices. The second phase combined theoretical and practical aspects of surgery. It included a presentation detailing all steps leading up to and including hydrocele surgery, from patient admission to discharge. The training also included how to complete data collection tools and conduct surgery on the FASTT surgical simulator. The third and final phase consisted of performing supervised surgeries on hydrocele patients in the operating room. All trainings included an initial evaluation of participant skills, starting with the surgical simulator. Following surgery on the simulator, another assessment of the surgeon’s skills was conducted during live surgery on a patient. By the end of the project, enough national trainers were trained to ensure that each of the country’s regions had a national trainer fully qualified to conduct hydrocele surgery trainings using FASTT.

The project’s introduction of the Filaricele Surgery Training Package has led to increasing interest from the MOH in adopting this package as a preferred training methodology. The hydrocele surgery training activities conducted under the World Bank project used the FASTT national trainers trained under the MMDP Project and the Filaricele Surgery Training Package. A workshop to introduce the FASTT simulator to the National School of Public Health and the Health Sciences Training and Research Unit was held in February 2019. At the end of the workshop, participants adopted FASTT as an educational tool for use in training institutes (when the surgical simulator and associated parts are available) and recommended its introduction into the curricula for training medical students. A donation of FASTT bases and cartridges was made to each training institute at the workshop and to the PNMTN. However, the major challenge remains ensuring a steady supply of the FASTT cartridges and bases.

### Hydrocele Surgery and Follow-up Activities

Hydrocele surgeries supported by the project in Burkina Faso took place primarily in two regions: Center North and Hauts-Bassins. These hydrocele cases were managed through the routine health care system, with the project training local health staff and providing assistance in case identification, supervision, provision of drugs and consumables, and payment of fees related to the surgical procedure.



The project used local media to deliver information to communities about hydrocele as well as the treatment method and locations where treatment was available. Radio messages broadcast in both French and local languages focused on the various aspects of LF to ensure communities' understanding of the disease and its treatment options. In addition, public criers encouraged any person suffering from a hydrocele to identify themselves to health workers to be registered and receive information about when, where, and how to seek treatment.

The project organized planning meetings with regional, district, and health center staff to develop plans for the MMDP Project-supported surgeries and to ensure that each operating theater would receive an adequate supply of the necessary drugs. The routine health system has a finite capacity that cannot always meet the full demand for provision of surgeries and post-operative care, particularly if other pressing medical issues must be addressed by the facility at the same time. The project learned that close coordination and more frequent communication with the PNMTN and health facility staff can help ensure that facilities prioritize the use of operating rooms for hydrocele surgery, when appropriate.

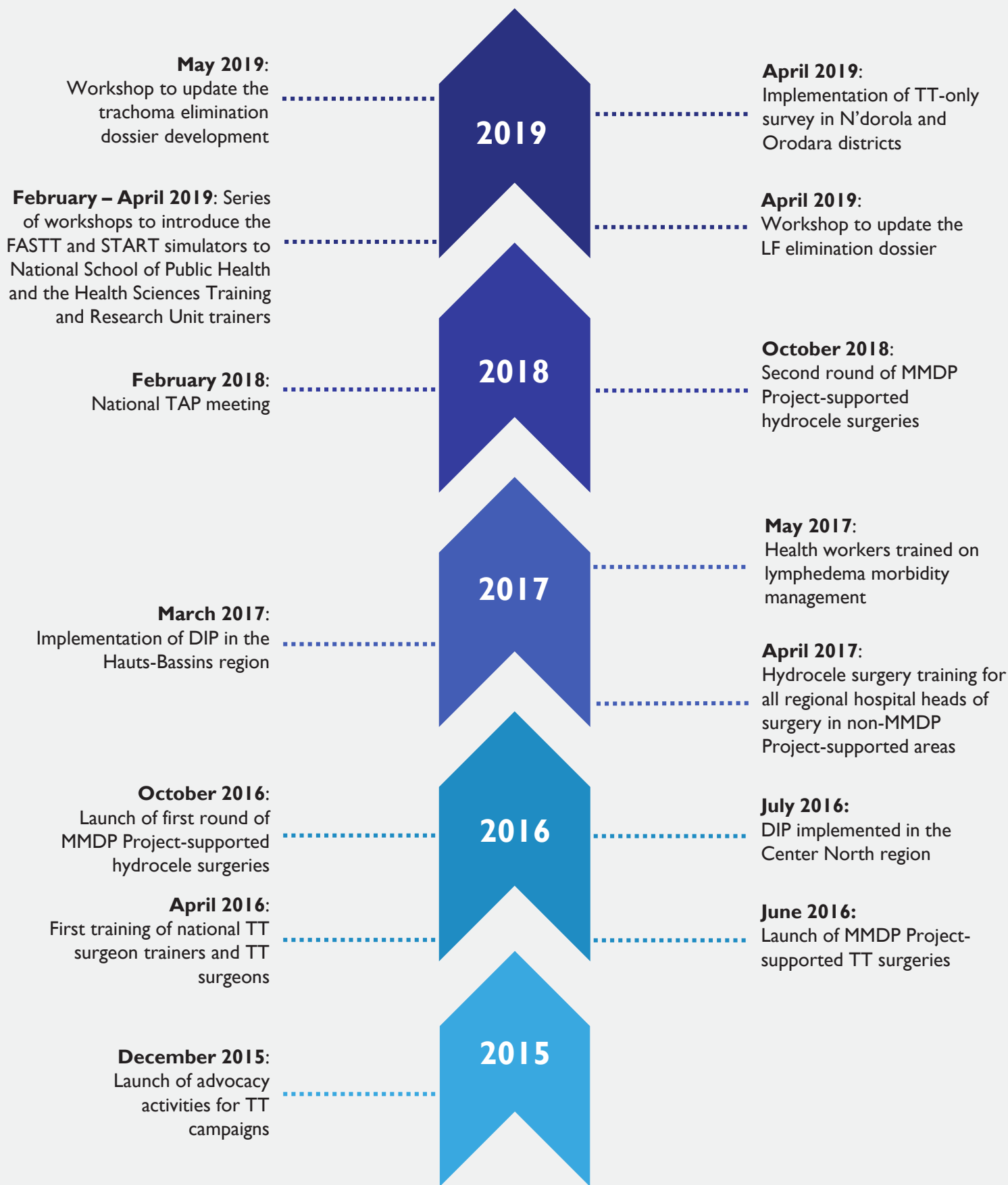
The project coordinated with the districts in both regions to obtain a list of suspected cases identified by CBHWs and nurses. These suspected cases were then invited to come to their nearest CSPA for case confirmation by an MMDP Project-trained surgeon. The list of confirmed cases was then sent to the relevant district as well as to the operating room team where the patient would receive surgery. A notice was also sent to each patient specifying his surgery dates and the arrangements to be made to prepare for surgery. Following each project-supported surgery, all operated patients remained at the health center for an average of three days for monitoring of the surgical wound and any potential complications. The project also advocated for follow-up visits to be conducted by health care workers for all operated cases at Day 1-2, Day 3, Day 5, Day 7, Day 14, Month 1-3, Month 6, and Month 12 post-surgery as part of routine health system services.

Supervision of activities at the regional and district level was provided by the project and the PNMTN. As the PNMTN was already implementing LF management activities before the start of the MMDP Project, national supervision tools were already available and being used. The project introduced supportive supervision approaches, adapting the collaborative team approach used for TT activities. In the Center North region, the project conducted hydrocele surgery and/or lymphedema management services in all six districts. Overall, the project supported a total of 979 hydrocele surgeries and training in self-care of 514 lymphedema cases in the region. In Hauts-Bassins, the project facilitated the provision of 189 hydrocele surgeries and training of 164 lymphedema cases in self-care.

## Progress Towards Elimination

Burkina Faso has had a long history of addressing LF, beginning with mapping in 2000 that found that all 63 (now 70) districts were endemic and the development of a national plan in 2001, which was followed by the first MDA, conducted in the South West region. By 2005, the PNMTN had scaled up MDA to all endemic districts. As of 2019, 61 of the 70 districts (87%) have stopped annual MDA following satisfactory results of the transmission assessment survey (TAS1). Of these 61 districts, 24 (39%) have subsequently passed TAS2, and 21 (34%) have passed the TAS3 using the immunochromatographic test or, since 2016, the filariasis test strip.

In addition to the success of its efforts to interrupt transmission, Burkina Faso has also made great progress towards satisfying the elimination requirements related to morbidity. Burkina Faso has outpaced many other countries in West Africa in managing hydrocele and lymphedema. The MMDP Project facilitated more refined patient estimations, facility assessments, and the development of a larger cadre of hydrocele surgeons and surgical support staff. The project also trained health staff and patients and their families in lymphedema management. All these elements leave Burkina Faso well-placed to meet elimination criteria. However, strengthened reporting of LF MMDP data as part of regular WHO reporting cycles is still needed. Furthermore, a key challenge facing Burkina Faso is that the departure of the MMDP Project leaves the country with only one donor, the Liverpool School of Tropical Medicine's Centre for Neglected Tropical Diseases (CNTD), investing in LF morbidity management. Support from major donors to increase this pool of external partners will be necessary if the country is to eliminate LF as a public health problem.







*"My daily life is completely different now. I can go anywhere I want with no problem. Now everything is possible. I'm completely healed." - Ousseni from Burkina Faso after his hydrocele surgery*



# Key Achievements in Cameroon

## Trachoma

### Country Overview

Though long suspected to be endemic, it was not until 2010 that population-based surveys for trachoma were conducted in Cameroon when the USAID-funded NTD Control Program awarded HKI funds to address the five major NTDs in the country. These surveys indicated high levels of endemicity for trachoma in the Far North and North regions. TT was a public health problem in three regions, with the Far North region bearing the biggest TT burden, followed by the North, then Adamoua region. MDA began soon after mapping and reached full scale in 2012. In 2011, Sightsavers began supporting surgical campaigns for TT in parts of the Far North, though additional public health efforts were needed to fully address TT in Cameroon.

The launch of the MMDP Project in Cameroon coincided with greater scrutiny of TT programs globally, with national programs increasingly being encouraged to adapt existing preferred practices to their national context. In light of this, HKI collaborated with the MOH and Sightsavers to adapt case finding, counseling, surgical supervision, organization of surgical camps, and systematic follow-up of patients to the Cameroonian context with a focus on increasing the number of cases managed and ensuring high-quality surgical results. Cameroon also became one of the earliest countries to conduct TT-only surveys to obtain TT prevalence data in districts that have a public health problem for TT but not TF. Despite delays in implementation caused by security concerns and an increasing difficulty in finding cases, the project succeeded in delivering essential TT management services and expanding its reach into communities.

At the start of the project, the number of people still needing TT management to attain the elimination threshold was estimated to be 3,421 nationally. The project focused its efforts on the two regions with the greatest elimination targets: the North and the Far North. In the North, the project supported campaigns in Poli and Touboro, the two districts in the region with the highest number of people estimated to need TT management. Despite these campaigns, each district's subsequent survey unexpectedly showed an increased TT prevalence rate. The project responded by organizing additional campaigns in the same districts, refining case finding strategies over time, and eventually shifting to a door-to-door approach. These efforts resulted in addressing 40% of the latest elimination target in Poli and 10% in Touboro. The project also supported collection of new data in the district of Garoua I, which shifted from below to above the TT elimination threshold after age- and sex-standardization of its baseline results, prompting the project to support a TT-only survey there in 2019 (the results of which were pending at the end of the project).

In the Far North, through a collaboration with Sightsavers, the project undertook campaigns in Meri and Tokombere that addressed a substantial portion of each district's elimination target (27% and 21%, respectively). Additional campaigns in Mokolo district in the first year of the project addressed 11% of the entire region's elimination target at the time, after which the district dropped below the TT elimination threshold when re-surveyed and no longer warranted intensive TT management services. Frequent surveys make it difficult to quantify the overall proportion of burden addressed by the project's 887 total surgeries in the region, but following nine years of project-supported and Sightsavers-supported campaigns, only three districts are currently estimated to have people still needing TT management before the elimination threshold is attained (Goulfey, Guidiguis, and Mada).

Another key project role was extensive liaising with the National Blindness Prevention Program (PNLCé) and WHO's Tropical Data team to facilitate sharing of age- and sex-standardized baseline data for the North and Far North in 2016 and for Adamoua in 2018. Age and sex standardization of Adamoua baseline data reduced the number of districts with a TT prevalence above the elimination threshold from two to one (Meiganga). The project supported a TT-only survey in Meiganga later that year, which demonstrated the district had met the TT elimination criteria.

Finally, the project made significant contributions to the documentation of the morbidity burden in Cameroon, the development of the elimination dossier, and the availability of health staff trained to identify and appropriately manage TT cases. In addition to training and certifying 10 TT surgeons (from 24 trained), the project also trained 2,701 health area nurses and community outreach workers, most of whom will likely continue to provide services long after the project close-out.

Figures 8 and 9 below illustrate changes in the estimated remaining elimination target over the course of the MMDP Project.

Figure 8: Estimated Remaining Elimination Target at the Start of the MMDP Project, Cameroon

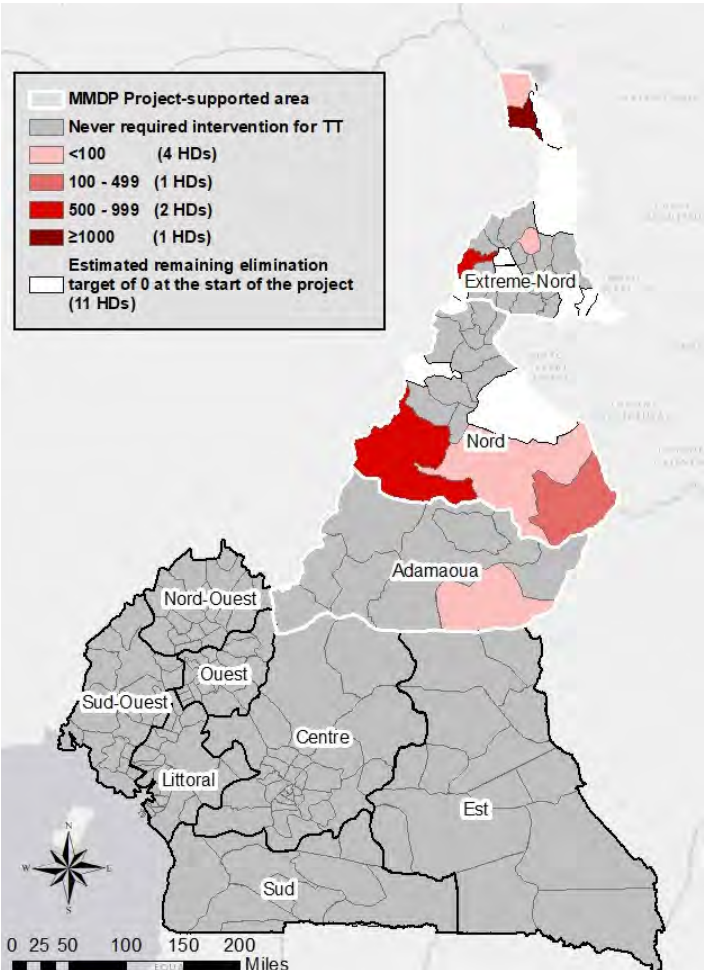
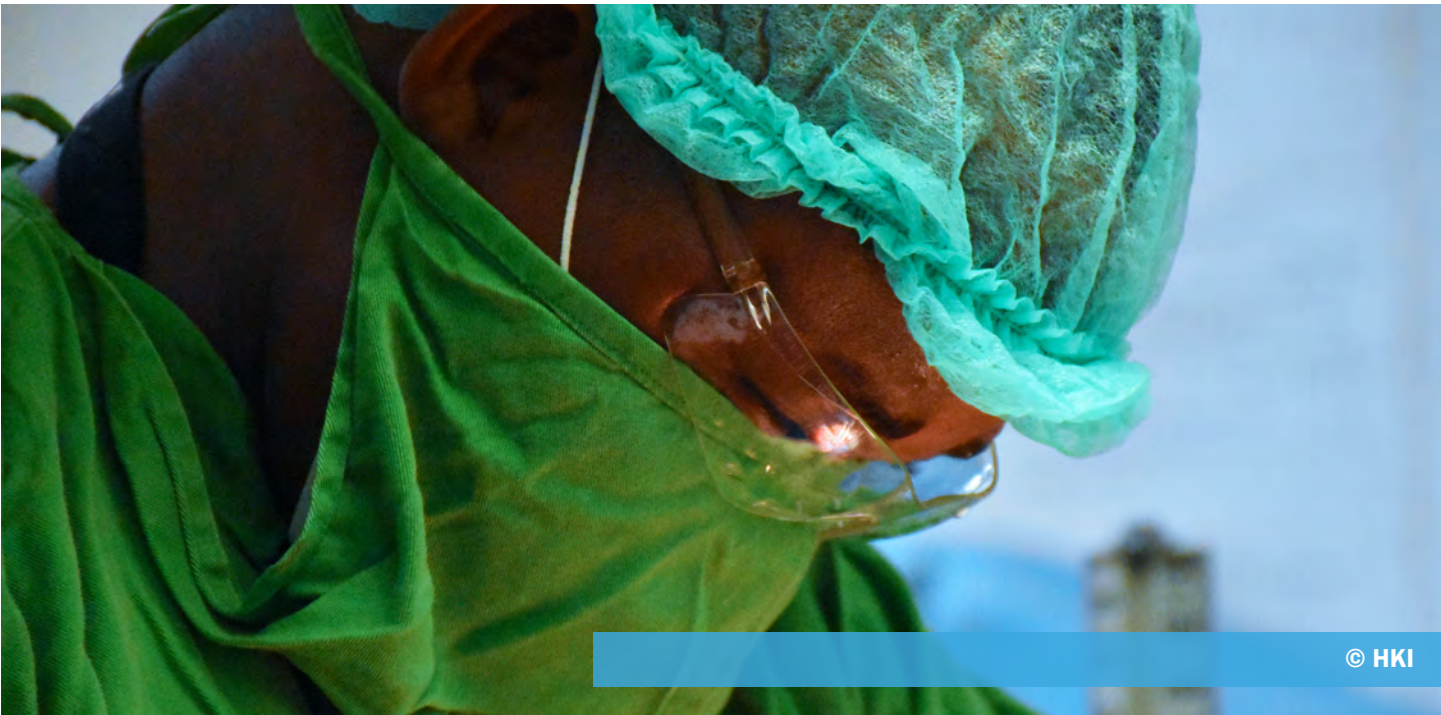
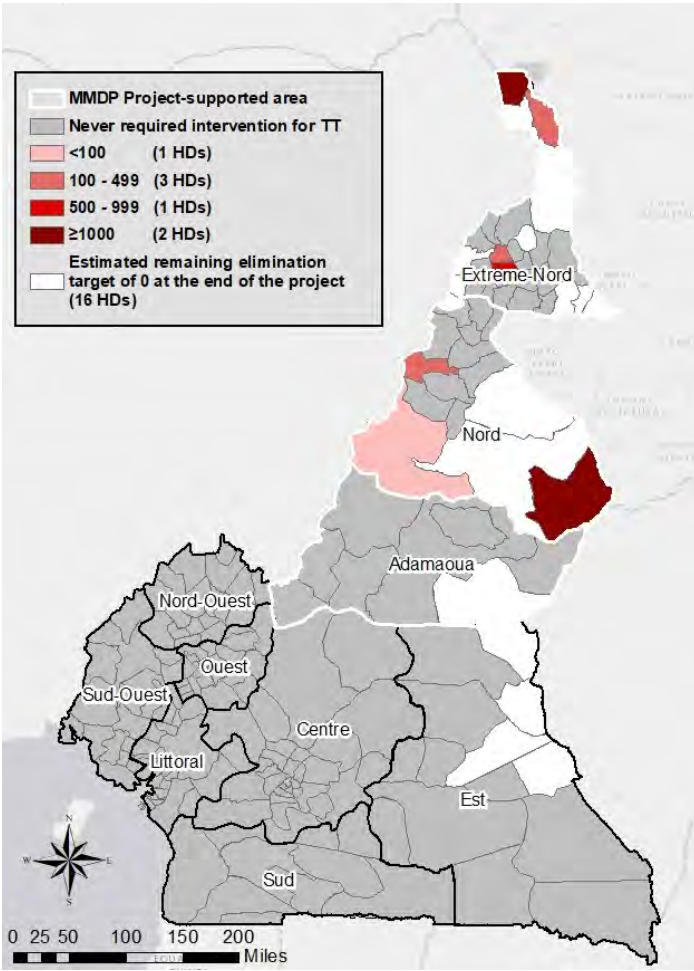
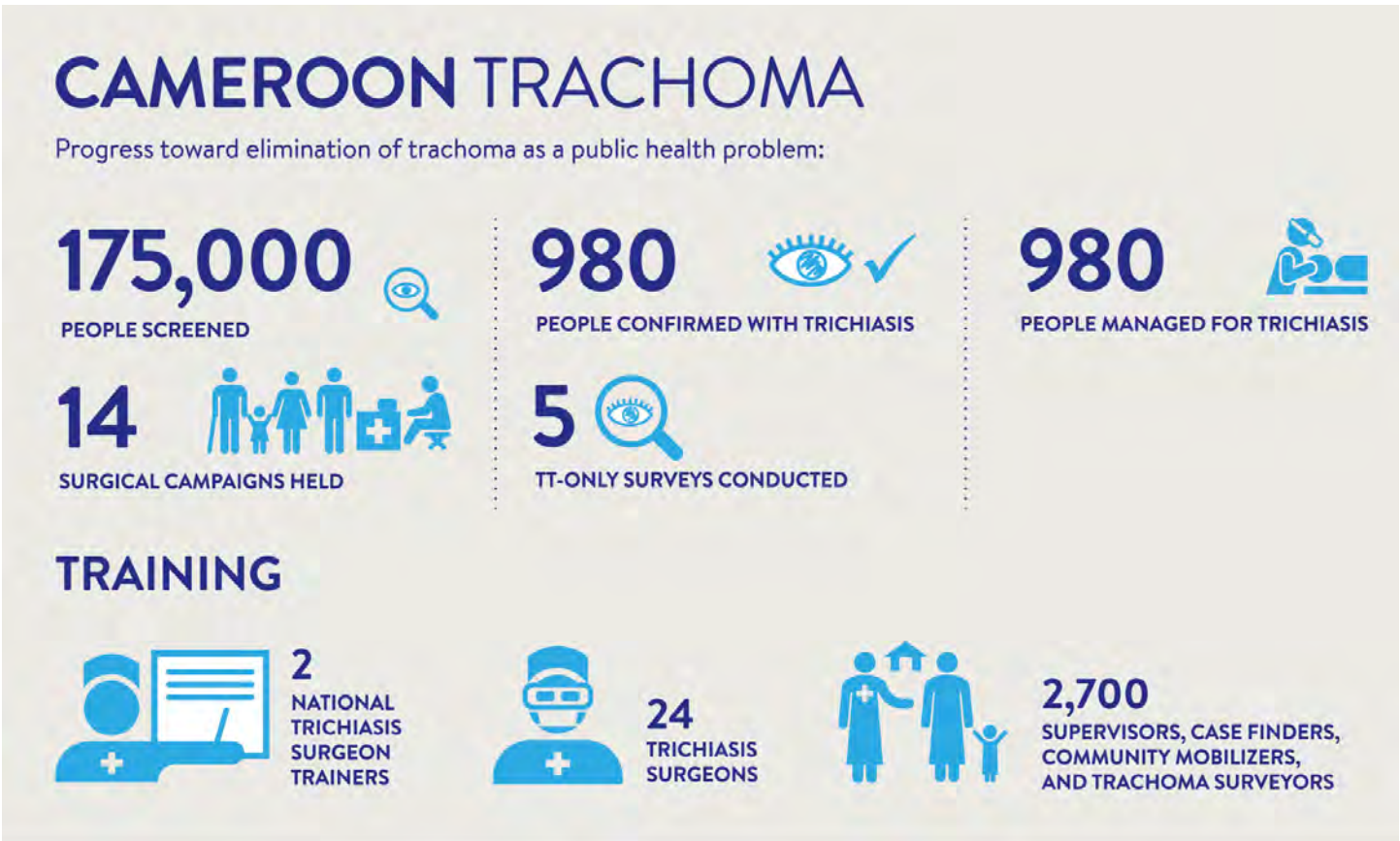


Figure 9: Estimated Remaining Elimination Target at the End of the MMDP Project (as of June 2019), Cameroon





### Key Achievements



### TT Campaigns

In Cameroon, the project provided TT management services in the North and Far North regions. In 2016, to respond to challenges that arose from working in a low burden setting, the project switched from a passive to a more active case finding methodology in order to reach more people with TT. Other pre-campaign activities remained essentially the same. Each campaign was preceded by a series of advocacy and social mobilization activities at the district, regional, and national level to obtain the support of key stakeholders and to ensure the delivery and uptake of services in target communities.

Advocacy activities were organized at the district and regional level. This included district-level meetings, which were held prior to each of the TT surgery campaigns, with district authorities to inform them of campaign objectives, the schedule of the surgical teams, and how they could support field activities. As a result of these meetings, local authorities worked with village chiefs to spread sensitization messages through local channels, including churches, mosques, and markets, to encourage people to attend campaign community meetings.

Community-level social mobilization activities included radio messages, public criers, and the distribution of IEC materials. The project delivered IEC materials in the form of posters, flyers, and fact sheets to outreach workers at the district level; the materials provided general information on trachoma, the screening process, and the availability of free services. Messages on TT, the importance of screening, and the availability of free care were also broadcast via local radio stations before and during campaigns in official and local languages. In addition, prior to each of the TT campaigns, village leaders organized community meetings in each of the target villages. During the meetings, health area nurses provided general information on trachoma and the free surgeries offered by the health system with project support.

Based on early experiences when project teams had a difficult time finding trichiasis cases during the very first campaigns, in 2016 the project introduced a screening phase to the community meetings. At the end of each meeting, health area nurses screened and recorded



suspected cases and conducted home visits to other potential cases identified by community outreach workers. The number of suspected cases and other operational factors then served as a basis for organizing travel and selecting surgery sites for campaigns (such as schools or health centers). During each campaign, community outreach workers sought out the individuals on the list of suspected cases and directed them to surgery sites, where their diagnosis could be confirmed.

In 2018, the project modified the case finding approach further. Given continued TT prevalence above the elimination threshold in targeted districts despite previous surgery campaigns, the project transitioned to door-to-door screening in selected villages. Screening teams consisted of a TT surgeon, a nurse, and at least one community outreach worker. The latter served as a guide through the village by orienting the rest of the team to the different households. The nurse coordinated all social mobilization and behavior change activities and the surgeon screened all persons found in the household. All identified TT cases were then recorded and referred to a surgery site.

Across all campaigns, individuals with confirmed TT received pre-operative counseling. After surgery, cases received post-operative counseling and were reminded of key post-operative medical appointments: Day 1 for the dressing and Day 7-14 and 3-6 months post-surgery for routine monitoring. All patients who refused surgery despite counseling were offered epilation counseling, which included receiving forceps and guidance on how to use them. Individuals with lower eyelid TT, post-operative TT, or those who were less than 15 years old were referred to a higher-level facility for surgery.

Overall, in Cameroon the project examined a total of 175,156 people (54% women), of whom 983 were confirmed to have trichiasis. Of these confirmed cases, 887 people received trichiasis surgery (65% women), 95 people refused surgery, and 44 were referred to a higher-level facility for surgery (due to lower eyelid or post-operative trichiasis). Among the five districts where the project supported surgeries, two districts (Meri and Touboro) achieved 100% coverage of their health areas. The other three districts (Mokolo, Tokombere, and Poli) covered between 50% and 83% of their health areas, as expected, due to their larger size. A total of 46 health areas were included in the project's provision of trichiasis management services.

## Capacity Building

In Cameroon, the project implemented a range of capacity-building activities to enhance the skills and knowledge of actors involved in TT surgeries and survey activities. Technical supervisors, TT surgeons, health area nurses, and community outreach workers were trained to provide high-quality screening, campaign management, and surgeries.

Prior to launching TT management activities, the project trained national trainers who would go on to train and certify TT surgeons and provide supportive supervision for TT surgeons. These national trainers were trained in supportive supervision; training methods and the principles of adult learning; interpersonal communication; refresher and upgrade training on the Trabut surgical technique using the HEAD START surgical simulator; recommended practices in TT treatment, infection control, and health care waste management; and the use of supervision tools. The project also trained representatives from the regional delegation and district-level staff as non-technical supervisors to provide complementary supervision. The non-technical supervisors did not provide feedback on the surgery itself but supervised the overall camp process and the procedures used, such as monitoring whether the correct waste disposal procedures were followed, how patient intake and flow were organized, and if data collection forms were complete and correct.

Trainings for TT surgeons included sessions on the preferred practices for TT surgery, standard pre-/intra-/post-operative procedures, WHO standard precautions regarding infection control and health care waste management, the Trabut surgical technique using the HEAD START surgical simulator, and TT surgical quality standards. This was supplemented with a practical phase: practice with the HEAD START surgical simulator and TT surgery on live patients under the supervision of the national trainers who doubled as technical supervisors. To ensure the consistency of project-supported TT management services, the project also organized refresher trainings for TT surgeons prior to each campaign. Depending on results of the supportive supervision and 3-6 month follow-up, refresher trainings sometimes did not include a HEAD START session if the surgeon had demonstrated adequate competence.

In addition to the refresher session for surgeons, the project organized trainings for health area nurses and community outreach workers prior to each campaign. Health area nurses were responsible for organizing all campaign activities at a health center. This included holding community meetings, training community outreach workers, monitoring social mobilization activities, and helping with the actual surgery process. Training sessions for the health area nurses focused on supervision of social mobilization activities, organization of surgery sites, pre- and post-operative care, and post-operative monitoring.

Trainings for the community outreach workers were held in the health areas that were targeted for surgery campaigns. The main objective of the trainings was to provide community outreach workers with the skills required to implement social mobilization and sensitization activities. The trainees learned how to disseminate the following information in very simple terms in local languages: symptoms of trachoma, risks associated with TT, and the advantages and availability of TT surgeries. They were also trained in the mobilization, counseling, and referral of people for post-operative appointments. The health area nurses previously trained by the project led these sessions.

With technical support from Tropical Data consultants, the project also organized a training for individuals involved in TT-only surveys. Trachoma graders, recorders, and supervisors were trained to organize and monitor implementation of TT-only surveys, with emphasis on TT case diagnosis and data management using WHO's Tropical Data platform.

## HEAD START in Cameroon

The HEAD START simulator was introduced into the surgeon training process in Cameroon through the project. By the end of the project, the PNLCé planned to include the use of the HEAD START simulator in the training process for Ophthalmic Physicians and Eye Care Technicians, which includes a practical eyelid surgery phase. To contribute to this process, the project donated six HEAD START simulators and 986 replacement cartridges to the PNLCé in 2019.

## TT-only Surveys and Trachoma Action Planning

In June 2018, the MMDP Project and the ENVISION Project supported a TAP workshop to document the progress made towards the elimination of trachoma in Cameroon. The workshop participants helped to identify remaining activities, develop a plan for the implementation of those activities, and define a timeline for the development of the trachoma elimination dossier. In preparation for the workshop, the MMDP Project helped the PNLCé to organize TT data into the WHO Excel template that will be needed as part of the elimination dossier submission.

Through support for TT-only surveys, documentation of TT burden data, and the national TAP meeting, the project also contributed to Cameroon's assessment of the TT burden and the remaining gaps for completion of the elimination dossier. The project worked with the PNLCé to organize TT-only surveys using the Tropical Data platform in five districts: Touboro, Mada, Meiganga, Garoua I, and Kar-Hay. After each survey, the project facilitated coordination between the PNLCé and Tropical Data with the goal of obtaining age- and sex-standardized TT prevalence for these districts to use in planning for the provision of future TT management services. The age- and sex-standardized prevalence rates for Meiganga, Garoua I, and Kar-Hay are pending final confirmation.

## Progress Towards Elimination

With the work done in Cameroon through the project over the past five years—coupled with a new tranche of Sightsavers' funding through Accelerate and recent trachoma surveys showing the country is nearing its target for reducing active disease to below the threshold—impressive gains have been made toward eliminating trachoma as a public health problem. The next steps for Cameroon are to systematically provide services to those still needing TT management before the elimination threshold can be attained, develop the trachoma elimination dossier, and design a system to manage incident cases and cases in those districts that fall below the elimination threshold.

Cameroon's remaining elimination targets will continue to evolve as new survey data are made available and as Sightsavers continues support of TT outreach services. Additional activities and surveys may be needed, particularly in the following areas:

- The age- and sex-standardized TT prevalence rates from the TT-only surveys supported by the MMDP Project in Meiganga, Garoua I, and Kar-Hay are still pending final confirmation for future planning of service provision and inclusion in the trachoma elimination dossier Excel file.



- The East region of Cameroon was not suspected as endemic during the time of baseline mapping, but in 2018 WHO recommended baseline mapping in five districts that are contiguous with districts in neighboring Central African Republic with a high TF prevalence. These baseline surveys took place in 2019 with USAID support through the ENVISION Project. While the age- and sex-standardized TT and TF prevalence rates are below the WHO elimination threshold for four of the six districts, data for the two remaining districts are pending.
- Once finalized, results from 2018-2019 surveillance surveys (e.g., in Bourha, Guidiguis, Mogode, Mokolo, and Poli) will require confirmation of the age- and sex-standardized TT prevalence rates to determine if future intensive TT management services are warranted in any of these districts.

The challenges Cameroon will face are similar to what many countries will encounter when nearing elimination: the difficulty and cost of case-finding as well as knowing when to stop when the case finding data and survey data do not align. Cameroon will undoubtedly also face ongoing security problems in the Far North resulting from the presence of Boko Haram in neighboring Nigeria. As a recipient of Accelerate funds and USAID funds through the Act to End NTDs | West funding mechanism, Cameroon will be able to continue after the close of the project with case finding and morbidity management, handling these challenges as needed and adjusting its elimination target as impact and surveillance surveys provide new data.

Figure 10: Districts Above the WHO Elimination Threshold at the Start of the MMDP Project, Cameroon

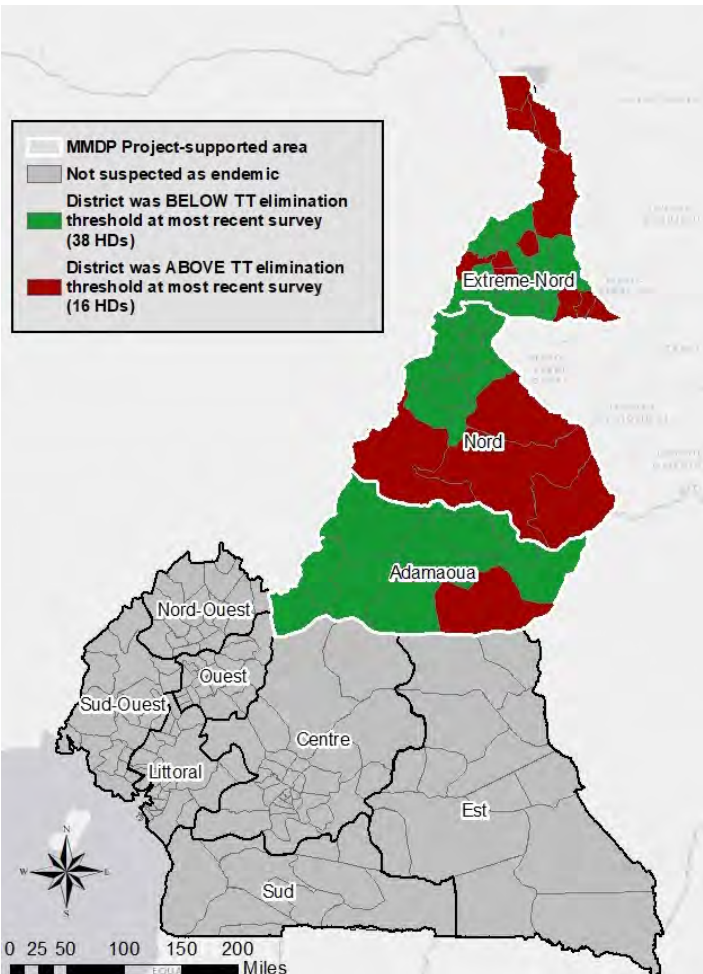
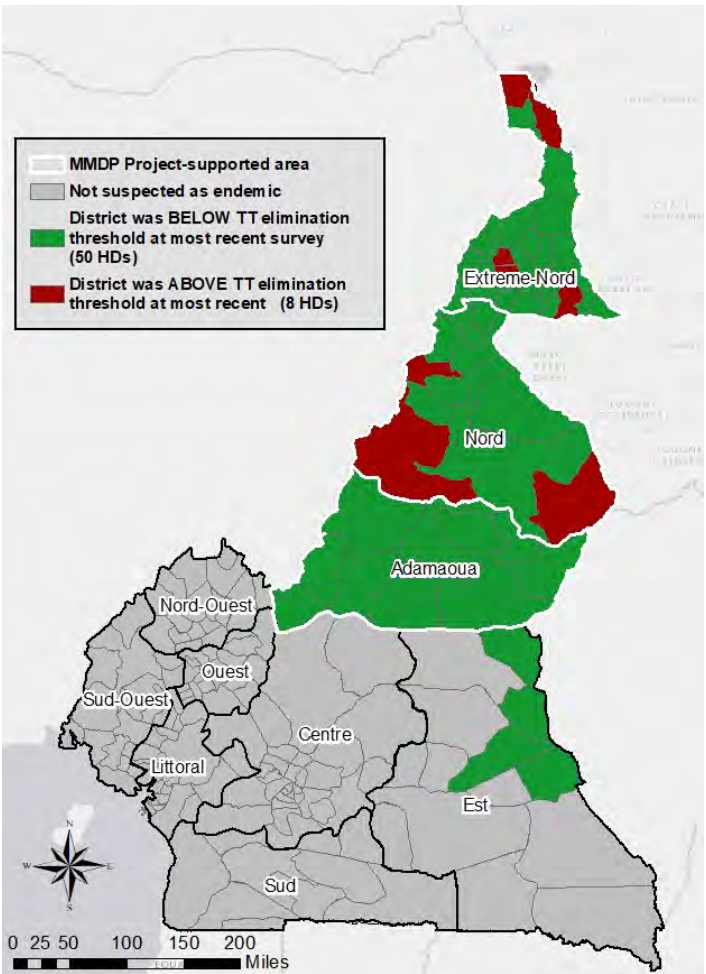


Figure 11: Districts Above the WHO Elimination Threshold at the End of the MMDP Project (as of June 2019), Cameroon







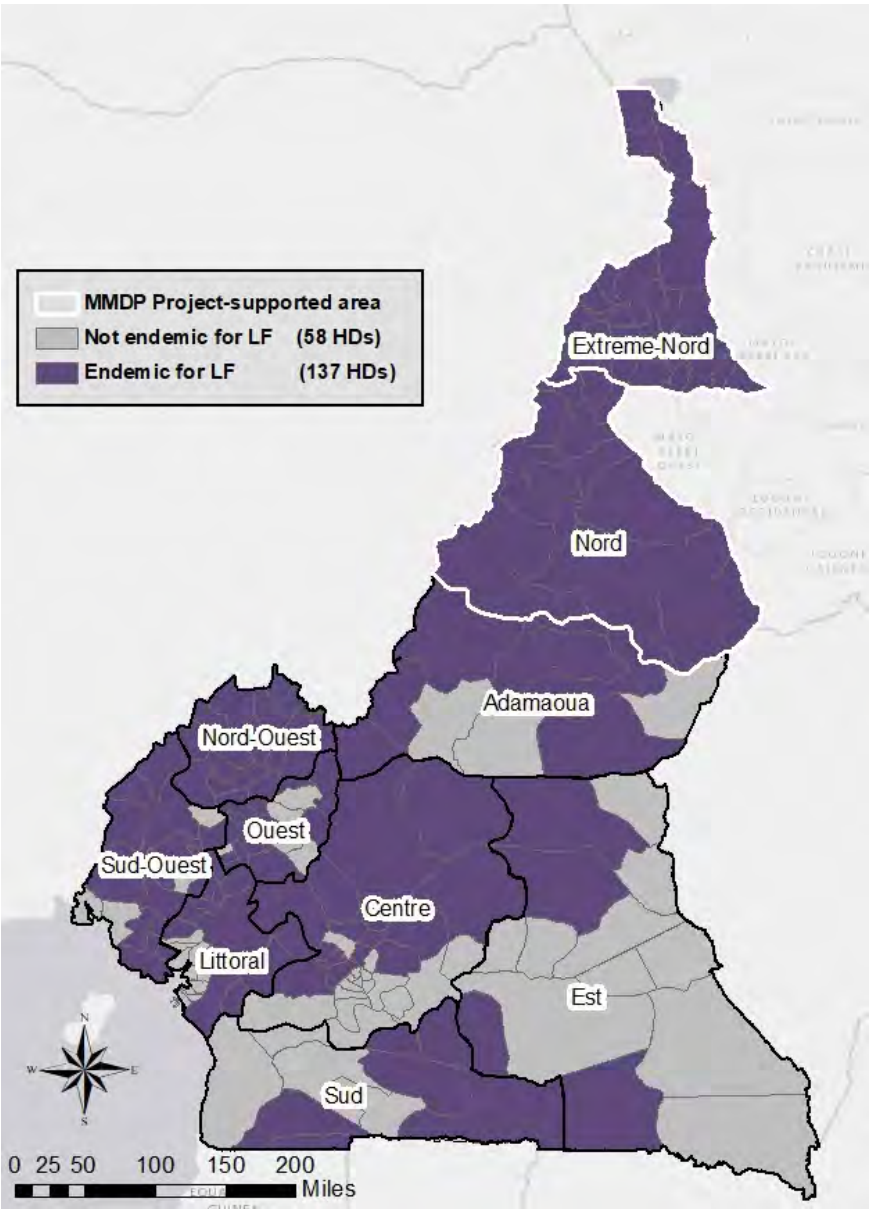


## Lymphatic Filariasis

### Country Overview

Mapping for LF in Cameroon took place between 2010 and 2012 and showed that the majority of the country's districts were endemic (see Figure 12). Data on LF morbidity in Cameroon, however, were limited and inconsistent. At the start of the MMDP Project, the National Onchocerciasis Control Program (PNLO) in Cameroon (which also manages the country's LF control program) was quite advanced in terms of progress toward interruption of transmission through MDA. However, on the morbidity side, other than sporadic support from the Government of Cameroon, hydrocele surgeries and lymphedema management services were inconsistently offered. Exposure to and experience in implementing international preferred practices for LF MMDP was also limited. The vast geographic spread of LF in the country highlighted the need for a national plan to identify and manage LF morbidity cases with high-quality services.

Figure 12: Lymphatic Filariasis (LF) Endemicity (as of 2010-2012), Cameroon



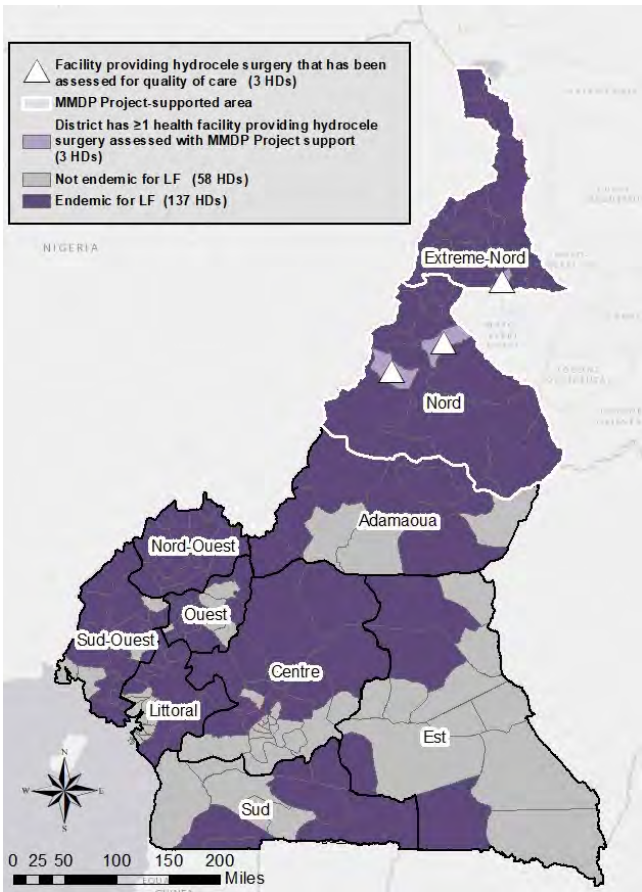
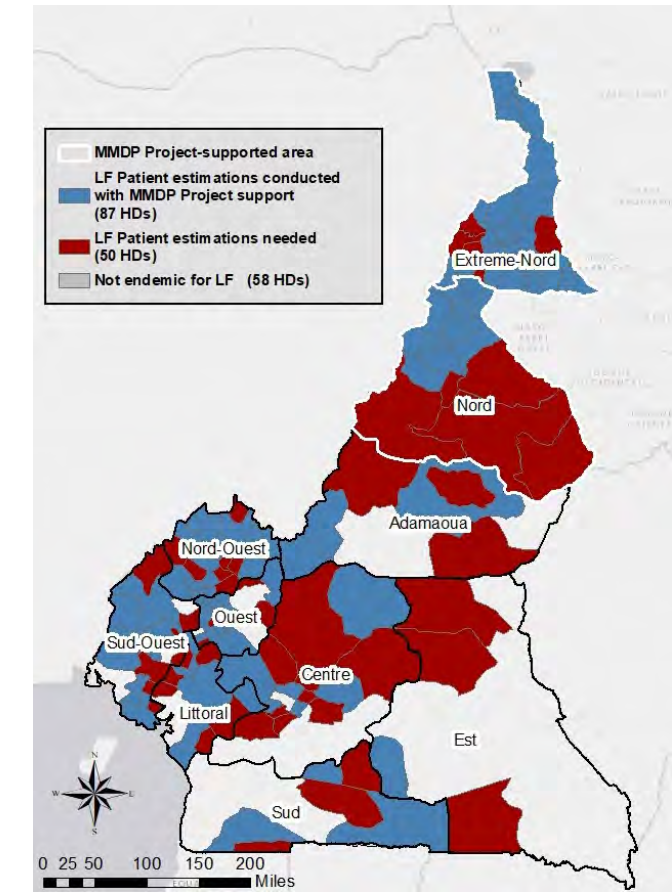
The project chose to implement LF activities in the North and Far North regions, which had many LF-endemic districts. A second rationale for this selection of regions was that the project planned to support TT management services in the same two regions (in addition to Adamaoua solely for TT). The project narrowed its focus to five districts within these two regions to pilot various approaches to hydrocele surgery and lymphedema management to determine the best strategies for providing these services at a larger scale within the context of Cameroon.

Since one of the criteria set by WHO for validation of elimination includes understanding the burden of LF, the project worked with the MOH to pilot various approaches for collecting patient estimations (see Figure 13). These included data collection during pre-TAS and TAS surveys and from community drug distributor reports. The project also implemented a community-based approach for identifying and referring hydrocele cases that involved training and mobilizing health area nurses. The community-based case finding activities resulted in identification and confirmation of 300 hydrocele cases and identification of 148 lymphedema cases. The project provided hydrocele surgery to 143 of the 300 hydrocele cases, and a total of 112 of the lymphedema cases identified received training in self-care. As the scale of project-supported activities was not designed to address the full disease burden across all five targeted districts, lists of remaining cases were shared with the appropriate health system staff for follow-up.

To help ensure a high quality of services provided, project-supported activities included assessing the quality of health facilities providing LF disease management services (see Figure 14) and organizing systematic post-operative follow-up of individuals receiving hydrocele surgery. The project also fostered cooperation among its supported countries by bringing lymphedema management trainers and a FASTT national trainer in hydrocele surgery from Burkina Faso, a country with a great deal of experience in managing LF morbidity. These experiences and lessons learned from MMDP implementation helped the PNLO in its development of the MMDP component of Cameroon’s draft strategic plan for LF and will continue to inform future strategic planning as well as elimination dossier development efforts.

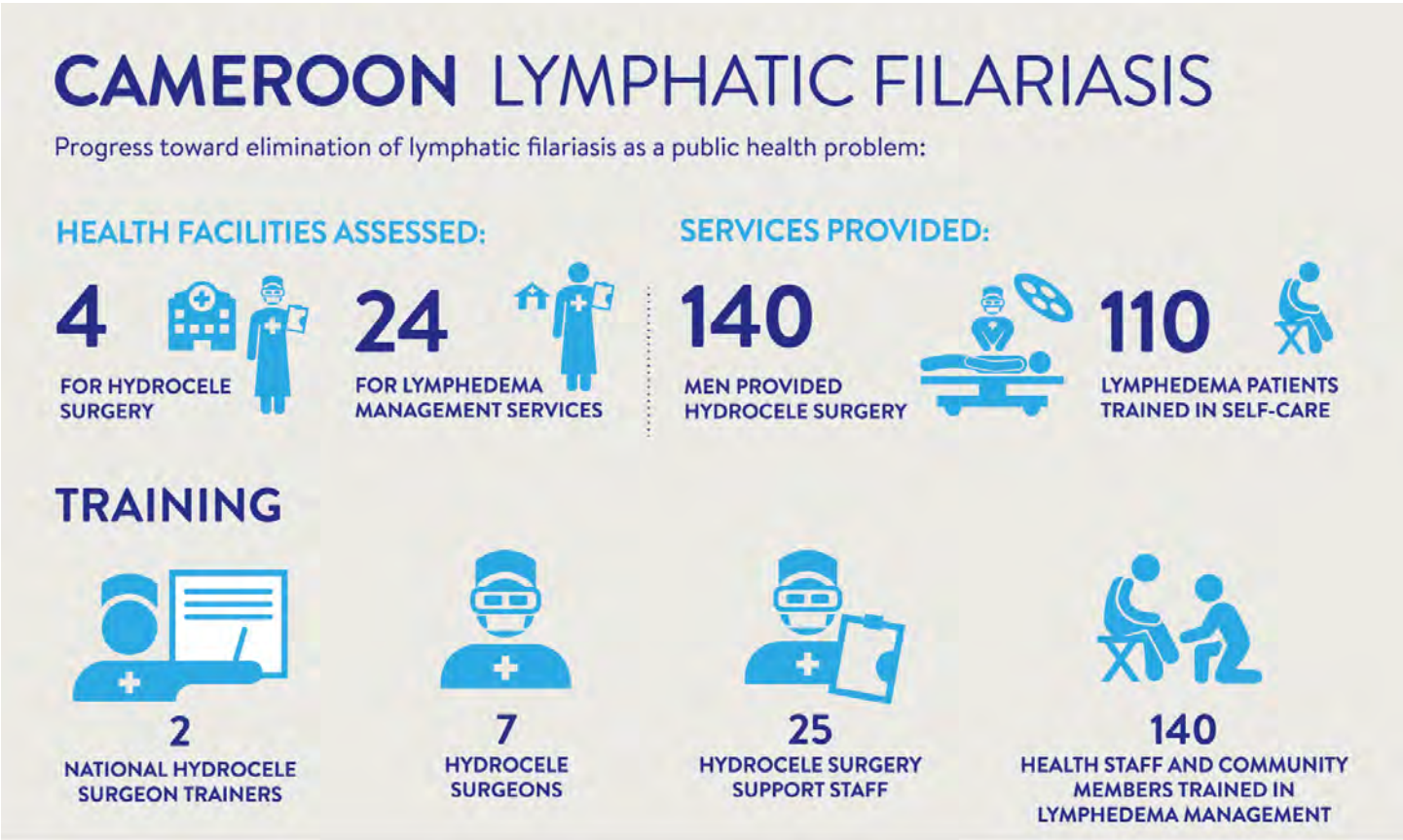
Figure 13: Districts with Lymphatic Filariasis (LF) Morbidity Patient Estimations (as of June 2019), Cameroon

Figure 14: Health Facilities Providing Hydrocele Surgery Assessed for Quality, Cameroon





Key Achievements



Situational Analysis and Burden Assessment Activities

The MMDP Project designed and implemented enhanced hydrocele and lymphedema case finding activities to refine burden estimates prior to delivery of services. The project employed two main approaches in 2017 to assess LF burden. The first approach involved collecting lymphedema and hydrocele case data in 12 districts across the country during the 2017 pre-TAS supported by the USAID-funded ENVISION Project. Once participating community members had gathered at central locations to provide blood samples for the pre-TAS, the project used trained health staff (typically a physician or a nurse) to conduct clinical examinations for signs of LF. This approach identified very few cases, many of whom lived outside of the project’s targeted areas. The project documented lessons learned from this process, sharing the results with the MOH and the global LF community.

The second approach consisted of lymphedema and hydrocele case data collection at the community level in the five pilot districts targeted by the project (Bibemi, Ngong, Kar-Hay, Guidiguis, and Kaélé). Using a two-phased approach, the project leveraged the existing structure of periodic community meetings already established within districts to collect data on lymphedema and hydrocele cases. First, the project organized community meetings at which trained health area nurses presented images of lymphedema and hydroceles to attendees and developed a list of suspected cases of “swollen scrotum” and “swollen feet.” In the second phase, the project confirmed the hydrocele or lymphedema diagnosis for each of these individuals on the list of suspected cases. This community meeting approach enabled the project to reach a larger portion of the population, although those suffering from hydrocele and lymphedema may not have participated in community meetings due to stigma or inability to walk long distances.

Through an LF situation analysis and DIP, the project also conducted quality assessments of select health facilities providing hydrocele and/or lymphedema services. The goal was to identify the capacity of health staff and health facilities to manage LF complications. The sample of health facilities assessed was extensive and included a list of health facilities in the five target districts to which the regional hospitals in Garoua (North region) and Maroua (Far North region) were added, for a total of 84 health facilities. Information was collected both remotely and through site visits from the following sources: a DIP questionnaire for health staff in each of the health

facilities; a DIP questionnaire for people suffering from lymphedema or having undergone hydrocelectomy; and semi-structured interviews with decision-makers and NGO managers, using the situation analysis interview guide. The activity revealed that staff members had not received specific training on lymphedema and hydrocele treatment and that only 58% of the health facilities assessed had the equipment necessary to treat hydroceles effectively, in part because not all health centers have operating rooms.

### Capacity Building

Capacity building activities for LF under the MMDP Project in Cameroon included training of national hydrocele surgery trainers and hydrocele surgeons as well as training of caregivers and patients on lymphedema management. The project supported two surgeons from Cameroon to attend a training of national hydrocele surgery trainers in Ouagadougou in September 2016. These two trainers then went on to assist international FASTT master trainers, Dr. Mante (Ghana) and Dr. Adama Guira (Burkina Faso), to train hydrocele surgeons in Cameroon using the Filaricel Surgery Training Package in combination with the FASTT simulator. This hydrocele surgeon training included theoretical sessions on hydrocele patient management and a practical phase during which trainees practiced hydrocele surgery on the FASTT surgical simulator. The final phase of the training consisted of supervised live surgery. The project also trained operating room nursing assistants and anesthetists to assist surgeons during the pre-, intra-, and post-operative phases of hydrocele surgery.

For lymphedema management, the project trained national trainers and health area nurses. National trainers were trained to organize and lead training sessions for health area nurses on home-based lymphedema management. The training included presentations on LF complications, clinical manifestations of the disease, management through washing and physical exercise, and a module on community monitoring of patients. In addition to the technical aspects of washing, the sessions included a review of the principles of adult learning, training, and supportive supervision.

The national trainers subsequently led a series of trainings for health area nurses on effective lymphedema management. The trainings were held in all five MMDP Project target districts (Kaélé, Kar-Hay, and Guidiguis in the Far North, and Bibemi and Ngong in the North). Participants gained general knowledge of LF, clinical manifestations of the disease with a focus on lymphedema and its treatment, the psychosocial consequences of the clinical manifestations, patient treatment, preventing and managing acute attacks, and management of lymphedema treatment data. The workshops also included a live demonstration and practice of limb washing on patients. Once trained, the health area nurses provided trainings for patients and their caregivers on home-based lymphedema management: effective techniques to manage their illness, how to prevent and manage acute attacks at home, how to wash affected limbs, and how to perform exercises to improve circulation in the lymphatic vessels. The project distributed washing kits for patients at the end of the trainings. Each kit included a plastic basin, a plastic bucket, a towel, a piece of soap, a container of Vaseline, and ointment. Through this cascade training, 112 lymphedema cases were trained in self-care.

### Hydrocele Surgery and Follow-up Activities

In addition to the lymphedema management activities described above, a key part of the project's work to determine key strategies and lessons learned for providing LF MMDP services was the provision of hydrocele surgeries. Surgeries were performed in Ngong and Bibemi health centers in the North, and Kar-Hay, Kaele, and Guidiguis health centers in the Far North. Of the 834 cases identified through community meetings and the project's burden assessment activities, 300 were referred for surgery by health area nurses. All were confirmed by surgeons as being true hydrocele cases, indicating a 100% diagnostic accuracy rate for health area nurses.

Once an operating schedule with cases, surgery dates, and times had been established, the health centers worked closely with community outreach workers to communicate appointments to the patients. In this first phase of surgeries, a FASTT national trainer observed each surgeon, providing technical supportive supervision and targeted feedback. Once the surgeons demonstrated sufficient technical skills, they independently conducted surgeries, with non-technical supervision carried out jointly by HKI and regional delegation teams. This non-technical supervision included ensuring the required consumables and drugs were available, that data was collected properly, and that patients were not required to pay for the project-supported surgeries. The project provided hydrocele surgery to 143 of the 300 hydrocele cases identified. Since the scale of the pilot was not designed to address the full disease burden across all five targeted districts, the list of remaining cases was shared with the appropriate health system staff for follow-up outside of the project.

Following all surgeries, the operated individuals were advised to remain in the hospital until Day 3 post-surgery. The project encouraged case follow-up (to be conducted by the routine health system) at Day 1-2, Day 3, Day 5, Day 7, Day 14, Month 1-3, Month 6, and Month 12.



As part of this hydrocele case management, the project provided resources for health staff to conduct post-operative follow-up within five days of surgery. Of the 143 patients that were operated under the project, 100% received follow-up within five days following surgery.

As an additional quality assurance measure, in June 2018 the project supported a stand-alone follow-up activity to interview and examine patients 6–12 months after surgery, as this is a critical time window in which recurrence can be linked to the quality of surgery provided. This follow-up activity aimed to ensure that individuals receiving surgery under the project received a 6–12 month follow-up

### Developing a national strategic plan for LF morbidity management

A pilot to identify effective approaches for providing LF MMDP services, a study on obstacles to seeking hydrocele surgery, and support from ESPEN provided critical information for Cameroon's draft LF MMDP strategic plan, an essential part of the LF elimination dossier submission.

examination which also included a quality of life assessment. A total of 80 patients (56% of the 143 operated cases) received follow-up. Trained surgeons conducted the clinical examination component. The data collected showed a recurrence rate of 10% (8 out of the 80 individuals examined). Of the 80 patients interviewed, 99% were satisfied with their surgery and 85% noted improved changes in their social interactions. The results of the pilot were used to inform Cameroon's national strategic plan for LF MMDP and also shared with the global LF community.

### Survey on Obstacles to Surgery

The project conducted an Obstacles to Surgery survey in September 2017 in the districts of Bibemi (North region) and Kar-Hay (Far North region). The survey was conducted prior to the start of programmatic surgical activities in order to identify potential obstacles that may prevent individuals from accessing hydrocele surgery and to enable the project to design activities accordingly. The survey teams collected data in villages from a sample of 86 individuals identified as potential hydrocele cases.

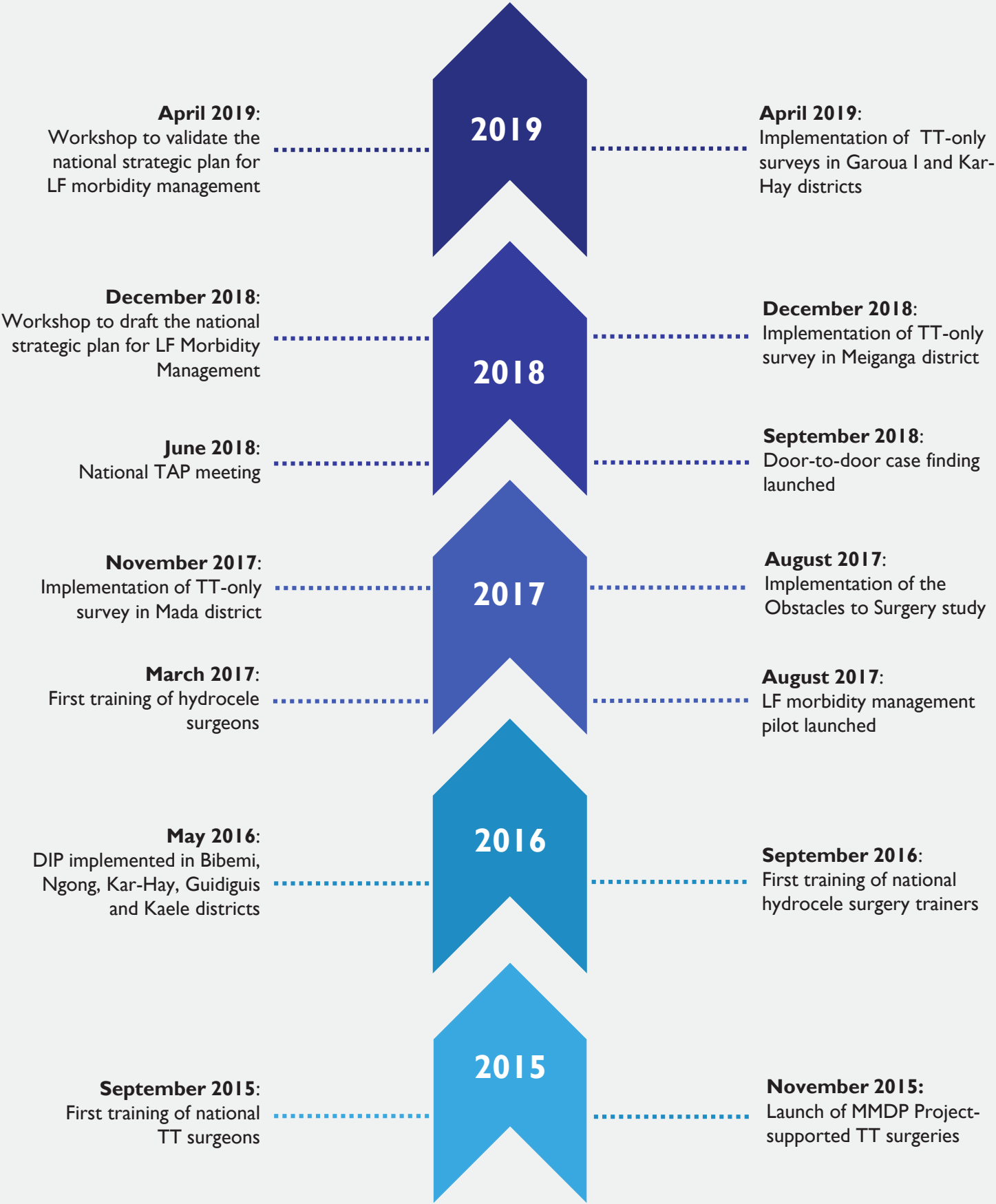
59 respondents, 44 (51%) reported that they would be able to cover only those costs related to transportation and food associated with the surgery—leaving 15 people (17%) who reported being unable to support any of the costs. In addition, 10% of respondents identified fear as a potential obstacle—specifically, fear of erectile dysfunction or of becoming sterile following surgery, fear of dying or the operation hurting, or fear of how others might perceive them after the surgery.

Key findings from the Obstacles to Surgery survey were used to design the services around the project's surgical activities and were shared with LF stakeholders, including the MOH, to inform the country's draft national LF strategic plan, which was developed with support from the MMDP Project.

## Progress Towards Elimination

Considering the widespread endemicity of LF in Cameroon and the coexistence of loa-loa, the PNLO has made tremendous inroads into interrupting transmission of the disease. In terms of LF morbidity, the country has a number of challenges. The overall national burden is not known, and with the MMDP Project coming to an end, there will be no other donor supporting activities, leaving a gap both in funding and technical support.

The next steps for Cameroon will be to continue collecting patient estimations and health facility data, including information on the quality of LF disease management services provided in these facilities. Additional assessments to better understand quality of services offered at health facilities, which can be conducted using the DIPs made available by the MMDP Project through its collaboration with WHO and CDC, will need to take place. Such assessments are critical to ensure health staff are qualified and health facilities have the needed equipment and supplies for lymphedema management and/or hydrocele surgery. Collection of patient estimations can also use and build on the approaches piloted under the MMDP Project. Collectively, this data will need to be synthesized and used to refine the national strategic plan for LF morbidity management that is under development. Strengthened reporting of LF MMDP data as part of regular WHO reporting cycles is also needed. Further development of the national strategic plan will need to include how the country's LF burden will be addressed. In addition to better positioning the country to develop its elimination dossier for submission to WHO, the plan could also serve as the basis for a proposal to generate external funding to support activities.







Ato Kumisa Gemechu Haro, of Ethiopia, suffered for years with a hydrocele. After receiving free surgery he “promised to educate family members, communities and anyone who is suffering from [a] similar health condition using the knowledge and experience” he acquired.



## Key Achievements in Ethiopia

### Trachoma

#### Country Overview

In 2015, the MMDP Project faced an enormous, multifaceted challenge in Ethiopia: supporting the FMOH's Fast Track Initiative, which had pledged 10 million birr (\$500,000) to clear the entire national TT surgery backlog, estimated at the time to be nearly 700,000 cases. Multiple partners had been supporting trichiasis surgical activities in Ethiopia for many years and had made meaningful but limited progress given the enormous burden of disease that was present. At the start of the MMDP Project, partners had begun supporting the FMOH and Regional Health Bureaus (RHBs) to implement the Fast Track Initiative in the regions of Amhara, Oromia, Tigray, and Southern Nations, Nationalities and Peoples' Region (SNNPR). USAID became a partner in this multi-stakeholder investment through the MMDP Project's commitment to support the FMOH's initiative in the two regions of Oromia and Tigray, where the ENVISION Project was providing MDA support. MMDP Project support for provision of trichiasis management services was initially estimated to address 11% of Ethiopia's overall elimination target for the country.

Over the life of the project, through partners RTI International, Fred Hollows Foundation, and Light for the World, the MMDP Project made significant contributions to reducing the number of people estimated to need TT management for Ethiopia to attain the elimination threshold in these regions. Although scale-up was challenging, progress was impressive: a total of 68,915 people with TT received surgery. The project also left a legacy by supporting the training and certification of TT surgeons, per WHO standards, capable of continuing to provide quality TT surgery beyond the project. Project-supported activities also helped in further instituting standards of quality assurance that have been adopted by the FMOH. Moreover, 11,649 TT case finders from kebeles throughout Oromia and Tigray were trained with project support and remain as important assets to identify and link suspected TT cases to surgery opportunities. At present, through the project support, 150 trained and certified TT surgeons are stationed in 127 primary eye care units to continue to manage TT in Oromia.

Figures 15 and 16 below illustrate the changes in the estimated remaining elimination target over the course of the project. Within the project's targeted areas in Oromia, provision of TT management services ultimately addressed 88% of the elimination target of 54,782, with 48% of the 123 project-supported woredas reaching their elimination targets. Within the project's targeted areas in Tigray, activities spanning 31 woredas addressed 93% of the 22,272 elimination target estimated at the start of the project. Although new survey results in multiple districts at the very end of the project resulted in substantially revised elimination targets for Tigray, the project's support to provide 20,664 surgeries remains an integral part of the region's progress toward elimination.



© William Nsai

Figure 15: Estimated Remaining Elimination Target at the Start of the MMDP Project, Ethiopia (MMDP Project-supported areas only)

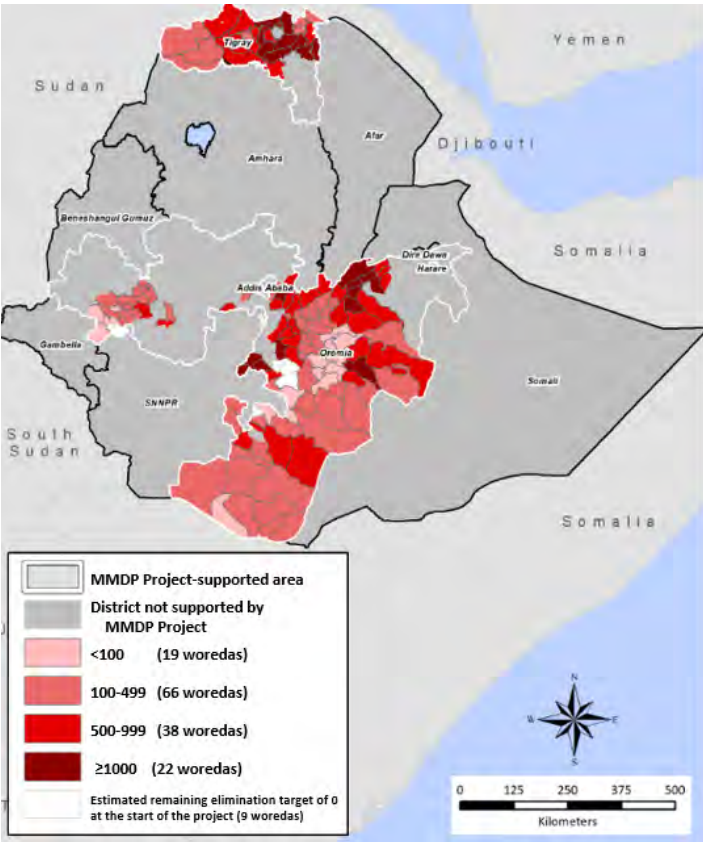
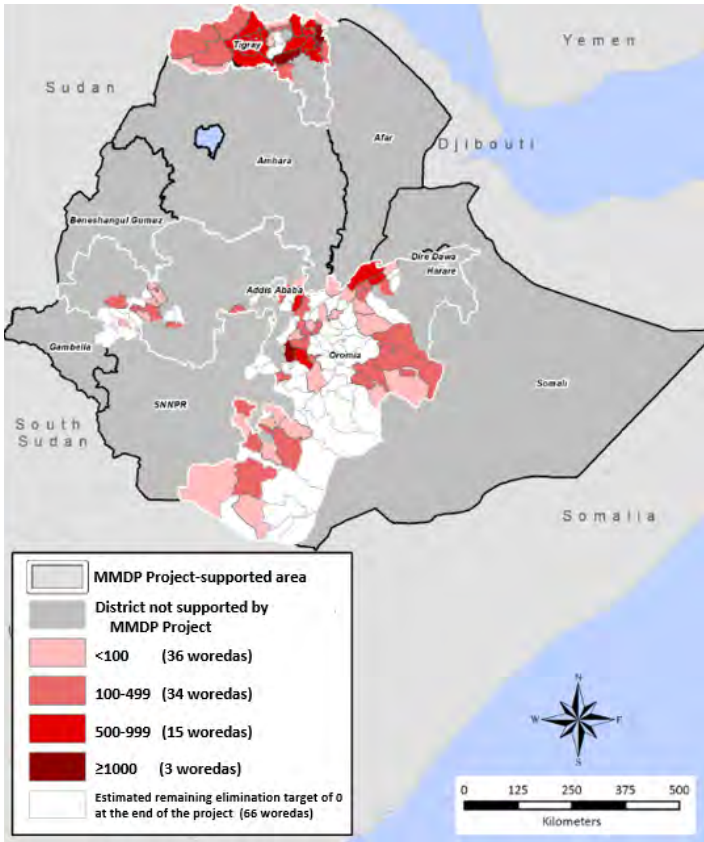


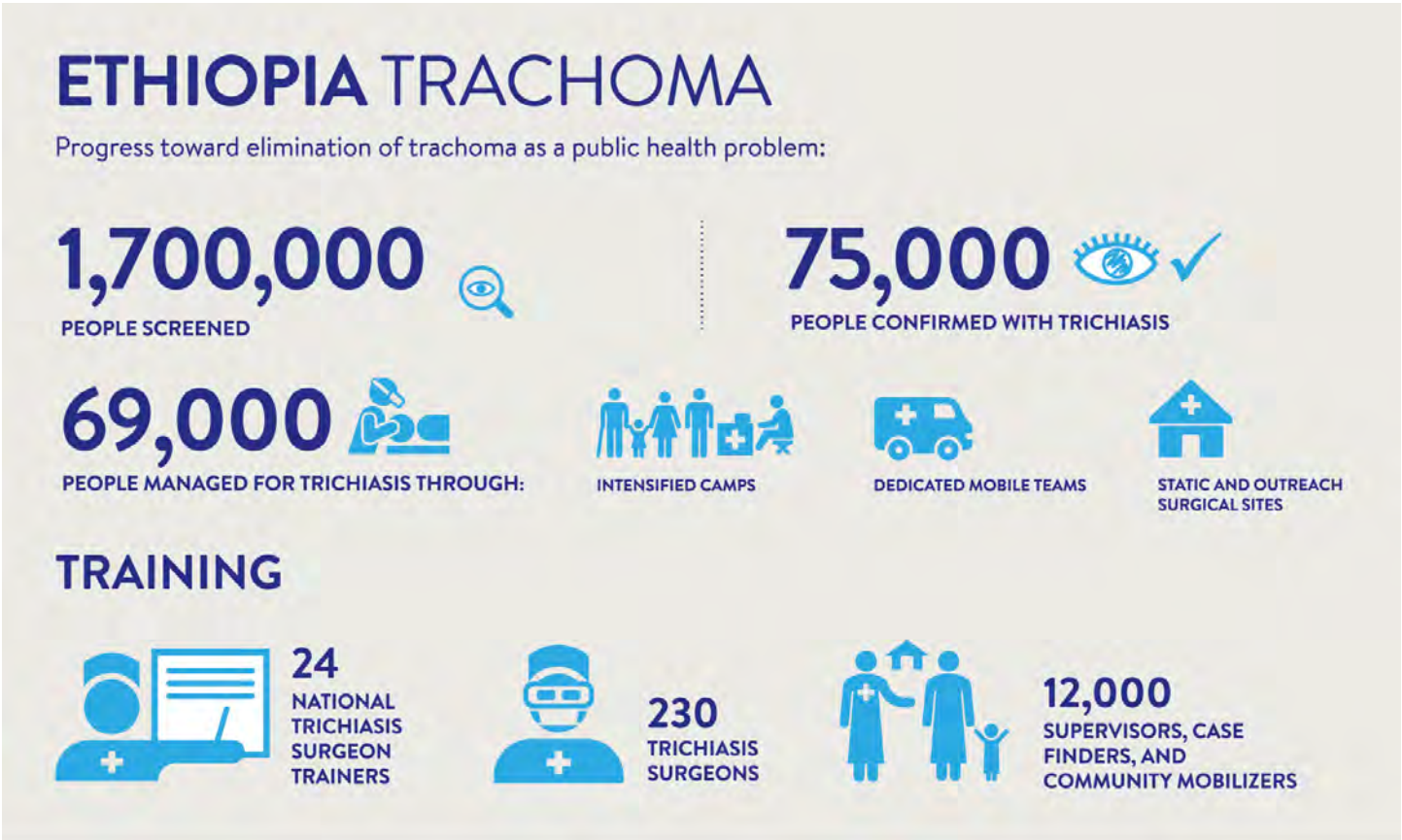
Figure 16: Estimated Remaining Elimination Target at the End of the MMDP Project (as of June 2019), Ethiopia (MMDP Project-supported areas only)



© William Nsai



### Key Achievements



### TT Campaigns

In Ethiopia, the MMDP Project partnered with RTI to provide TT management services in the regions of Oromia (through the Fred Hollows Foundation) and Tigray (through Light for the World). Surgeries were preceded by strategic planning, advocacy, and social mobilization activities. Advocacy activities consisted of zonal- and woreda-level meetings to foster greater ownership and leadership by local administration and political leaders. To encourage patients to use available services, the project broadcast radio messages in local languages in both regions on TT, the availability of services, and the benefits of surgery. In Tigray, the project also used the existing Tigray RHB network of Health Extension Workers (HEWs) and the Health Development Army (HDA). This network consists of more than 3,000 HEWs and HDAs trained and retrained by the project on social mobilization for TT surgery and TT case identification.

In Oromia, the project worked with the local government to deliver TT surgeries using a combination of three strategies: static and enhanced outreach services by Integrated Eye Care Workers (IECWs), dedicated mobile teams (DMTs), and intensified TT surgical camps. Static services were provided by IECWs at their respective health facilities. In addition, the IECWs conducted outreach visits to distant and remote areas. Using this method, they were able to reach cases that could not travel to the health facilities and provide surgeries in remote areas; this sometimes meant staying in an area for weeks at a time. DMTs and intensified TT surgical camps were used to expand case finding activities and manage a high volume of cases within a short time frame. The DMTs consisted of two TT surgeons and a coordinator who travelled to woredas with high estimated numbers of cases. Like the IECWs, DMTs often had to travel long distances to reach TT cases in remote areas, which meant being stationed in difficult situations for days.

For the intensified surgical camps in Oromia, the project mobilized IECWs and the DMTs to conduct TT case management activities at designated sites within a community. Camp teams consisted of two surgeons (one IECW and one DMT surgeon, or two highly experienced IECWs), one town crier/mobilizer, two surgery assistants, and one cleaner. The DMT surgeons led the camps, conducted TT surgeries, and mentored and supervised the IECWs. In 2018, the project implemented door-to-door case finding to identify areas

with large numbers of cases. DMTs and intensified camp activities were then focused in those areas. Post-surgery, the surgeons counseled the patients to return the next day, seven to 14 days later, and three to six months following surgery. Individuals who refused surgery were provided counseling on the benefits of surgery. Due to FMOH recommendations, the project limited support for epilation to individuals who refused surgery and had less than five inverted lateral eyelashes. Per FMOH policy, they did not receive epilation forceps. A list of those who refused both surgery and epilation was shared with the health system for continued counseling. In Oromia, in collaboration with the Oromia RHB the project screened 1,374,401 people and provided TT surgeries to 48,251 TT cases.

TT surgeries in Tigray were conducted through both static and outreach services. Static services were provided at both secondary and primary eye care units in the region's MMDP Project-supported zones, each of which has at least one trained and certified ophthalmic nurse. For outreach, TT surgeons travelled from the eye care units to health centers and health posts in the communities. The number and length of outreach visits varied each month. Before screening cases, TT surgeons provided patients with an overview of trachoma and its complications. After undergoing surgery, cases were asked to come back the next day for patch removal by the surgeon. During this follow-up, cases were counseled to come back to the outreach site seven days post-surgery for removal of the sutures.

Cases in Tigray with confirmed TT who refused surgery and with only one or two eyelashes turned in but not touching the cornea were counseled and epilated. Per FMOH policy, they did not receive epilation forceps. As part of the counseling, epilated individuals were informed that the eyelash will regrow in a few weeks and the permanent solution is a minor surgery. Lists of TT cases who were epilated and those who refused both surgery and epilation were shared with the health system for continuous follow-up and counseling. In Tigray, the project screened 294,671 people and provided TT surgery to 20,664 TT cases.

Overall, the MMDP Project in Ethiopia screened a total of 1,669,072 people, of whom 74,907 individuals were confirmed to have trichiasis. Of these confirmed cases, 68,915 people received trichiasis surgery (75% women), 2,999 people refused surgery, and 2,204 were referred to a higher-level facility for surgery (due to lower eyelid or post-operative trichiasis). Additionally, 40% (66 of 163) of the project-supported woredas reached TT surgery targets for elimination.

## Capacity Building

Since its inception, the project has helped to build the capacity of various cadres of Ethiopia's health workforce through direct training and supportive supervision, including clinical skills for surgeries, data management and M&E skills, project planning, financial management, and behavior change communication methods. This has resulted in a robust pool of skilled TT surgeon trainers, TT surgeons, surgeon supervisors, HEWs, HAD members, eye health professionals, and outreach coordinators deployed in health centers across Ethiopia to provide high-level care to patients.

To start, the project organized a series of Training of Trainers (TOT) sessions to increase the pool of professionals available to train surgeons using the HEAD START simulator. Participants were selected based on their qualifications as ophthalmologists or ophthalmic nurses and their extensive experience providing eye care services, including TT surgeries. The TOT candidates were drawn from major hospitals within the MMDP Project zones. The training curriculum was composed of theoretical sessions in the classroom, a HEAD START practicum, and live surgery.

In accordance with regional regulations, the project trained and certified two different cadres of health workers as TT surgeons: IECWs in Oromia and ophthalmic nurses in Tigray. Surgeon trainings adhered to the standards set in the WHO Yellow Manual, HEAD START training manual, and national TT surgeon training guidelines. Trainees were selected based on their visual acuity, binocularity, and manual dexterity as well as professional qualifications.

HEWs and HAD members were trained on TT case identification and TT surgery counseling. Since HEWs are both the distributors of Zithromax and the anticipated TT case identifiers, they were trained on finding, screening, and counseling TT cases in the community. All HAD members were trained on community mobilization. The project also trained door-to-door case finders on examination of community members for TT, counseling, and registration of households and suspected cases. Case finders were trained two weeks before scheduled outreaches. That way, they could be deployed the day after the training to their respective communities where they conducted door-to-door TT screening for four to six days.

Technical supervisors conducted regular supportive supervision of surgeries to ensure that operations followed WHO and FMOH guidelines and preferred practices. Such supervision supports improved medical skills and better medical outcomes, as well as strengthening the health workforce through human resource capacity development. To ensure that surgeons received regular supportive supervision, the project organized a training of technical supervisors, which Dr. Kello facilitated. The trainees were selected from a pool of certified cataract surgeons and senior ophthalmic nurses with demonstrated experience performing high-quality TT surgeries. They were trained on supportive supervision using the ICTC manual and on how to plan and budget outreach camps with the surgeons under their supervision. These supervisors travelled to both static sites and outreach services to ensure high-quality TT surgeries were taking place according to national and project guidelines. The supervisors used the MMDP Project's supervisory checklist, which was later used by the FMOH to design a national supervision checklist.

While the HEAD START simulator was already being used in Ethiopia prior to the launch of the MMDP Project, the project further promoted its use by including it in project-supported TT surgeon trainings and through a donation of HEAD START simulators and replacement cartridges to the FMOH in 2019.

**Informing national guidelines for Ethiopia**

The Ethiopian FMOH adapted a number of project-developed guidelines and checklists for incorporation into national protocols and procedures, leaving a rich set of resources on supportive supervision, outcome assessment, and surgical audit for continuing quality improvements.

Progress Towards Elimination

As the global trachoma map shrinks, Ethiopia will carry a larger proportion of the global burden. However, the country is making significant gains in scaling up surgery for trichiasis, antibiotics, facial cleanliness, and environmental improvement (known as the SAFE strategy). Mapping has provided data from 99% of the suspected endemic districts. MDA has been scaled up, with many districts completing the recommended rounds of treatment and awaiting either impact or surveillance surveys. With the FMOH dedicated to reducing the TT backlog to elimination levels and having committed funding, and with ongoing support from a number of donors and implementing partners, both political will and resources are available for continued intervention.

In the two regions where the MMDP Project focused its activities, project partners have committed to continue supporting the Oromia and Tigray RHBs in their provision of TT management services. The FMOH's quality assurance guidelines will guide implementation and help ensure activities are implemented in line with international preferred practices for supportive supervision, outcome assessments, and surgical audits. Fred Hollows Foundation will continue to support provision of TT management services in Oromia, and Light for the World will continue activities in Tigray. With funding coming through Sightsavers and from USAID through the Act to End NTDs | East funding mechanism, additional resources have been successfully mobilized to further support progress toward elimination. With this continued funding and external partner involvement coupled with strong on-going government commitment, the elimination of trachoma is within reach in both regions.



Figure 17: Districts Above the WHO Elimination Threshold at the Start of the MMDP Project, Ethiopia (MMDP Project-supported areas only)

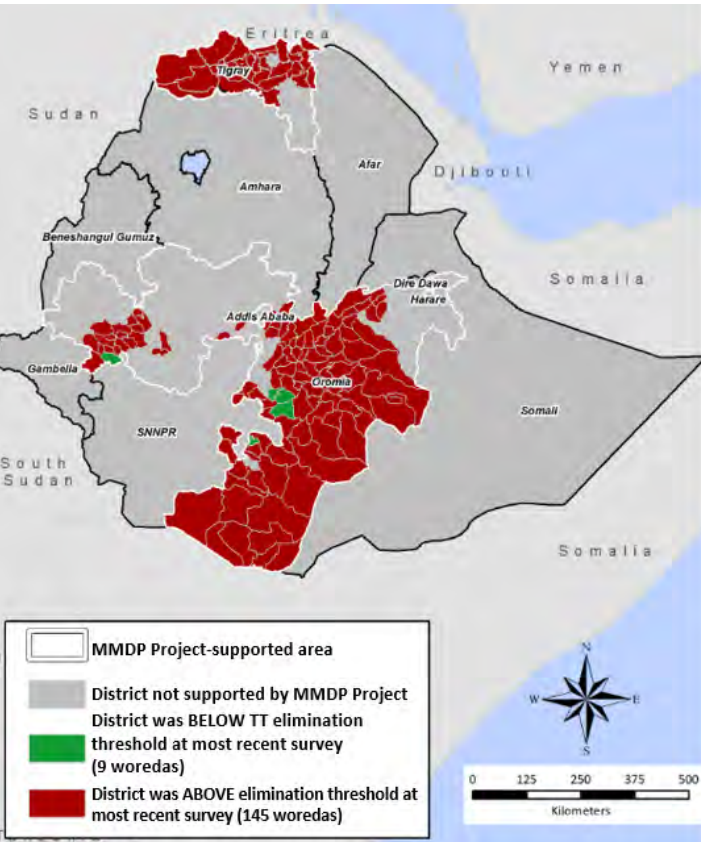
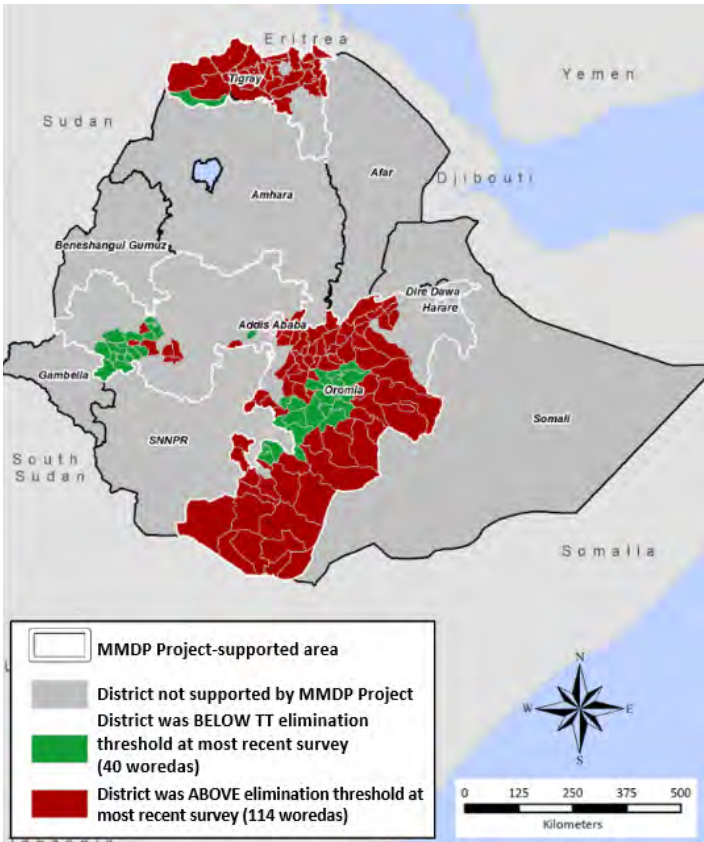


Figure 18: Districts Above the WHO Elimination Threshold at the End of the MMDP Project (as of June 2019), Ethiopia (MMDP Project-supported areas only)









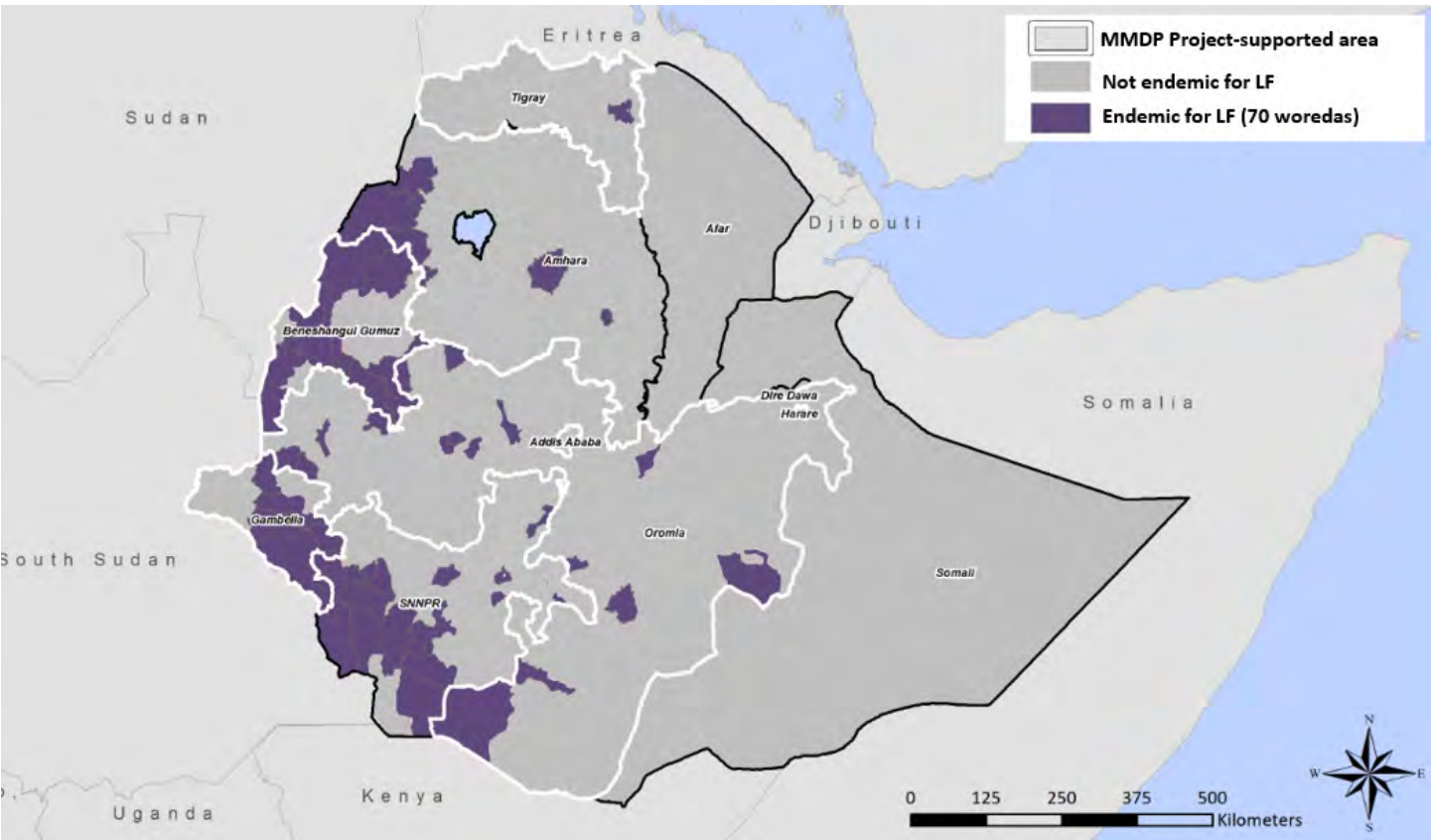
## Lymphatic Filariasis

### Country Overview

Prior to MMDP Project activities, LF morbidity management activities had been conducted in only a small percentage of the country’s LF-endemic woredas. During the life of the project, the principal partners supporting the FMOH’s LF morbidity work were RTI through the MMDP Project, and CNTD, supported by DFID. To coordinate their work, the FMOH assigned each partner specific regions. RTI supported the RHBs in Oromia, Beneshangul-Gumuz (BG), Tigray, and Gambella regions; CNTD supported activities in Amhara and SNNPR. For cross-cutting initiatives, such as the training of hydrocele surgeons, the partners shared costs and technical experience wherever possible, and CNTD supported the procurement of restricted medicines and supplies for hydrocele surgeries in project-supported areas throughout the project period. Both RTI and CNTD engaged a local non-governmental organization, NaPAN, to conduct LF burden assessments and trainings of clinical health workers to teach lymphedema patients self-care.

Country-wide mapping to measure LF prevalence was initially conducted in 2013, and then updated in 2015 with selective re-mapping (see Figure 19 below). Since mapping did not establish the LF morbidity burden, the FMOH established a goal of conducting burden assessments in all 70 LF-endemic woredas by 2020. The project supported burden assessments in 41 woredas (35 endemic, six non-endemic), spanning four regions of Ethiopia (50% of the total LF-endemic woredas).

Figure 19: Lymphatic Filariasis (LF) Endemicity (as of 2013-2015), Ethiopia



Results from the burden assessments were then used to design and implement services in all project-supported regions. The project supported 789 hydrocele surgeries, preceded by hospital readiness assessments, in nearly half of the country’s endemic woredas through surgery camps in BG, Oromia, and Gambella regions. Additionally, project advocacy led to a policy of free service provision for all LF MMDP services in the Oromia region.

Figure 20: Districts with Lymphatic Filariasis (LF) Morbidity Patient Estimations (as of April 2019), Ethiopia

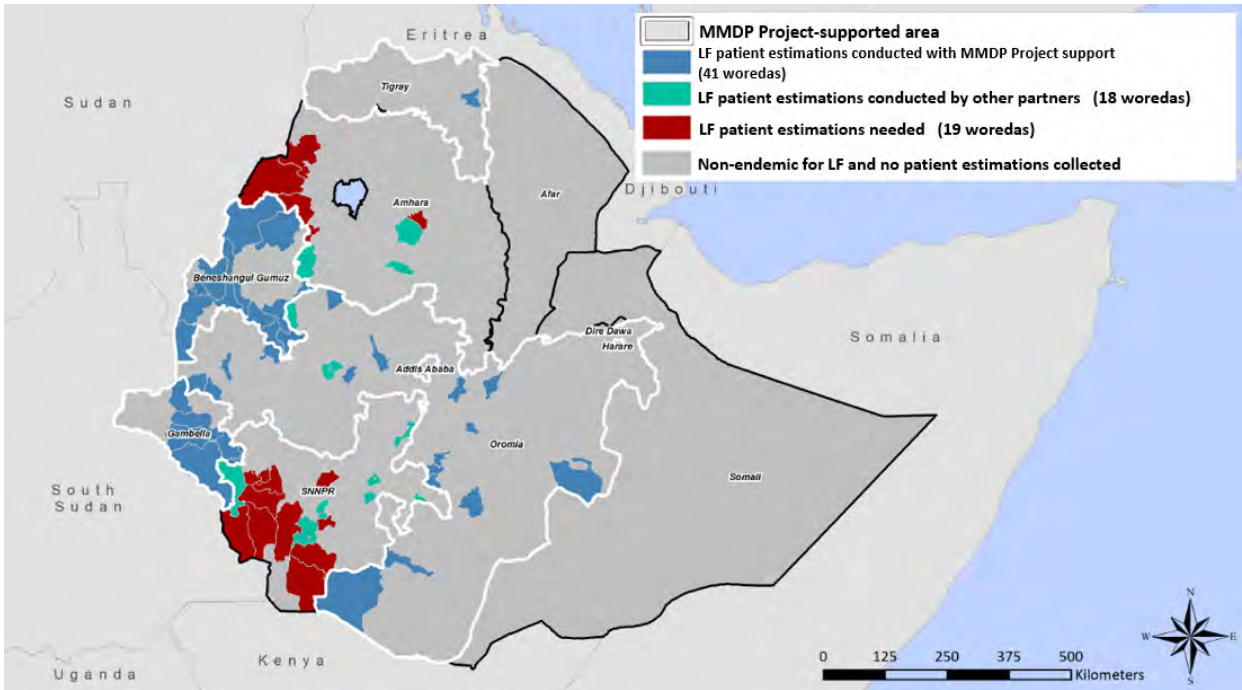
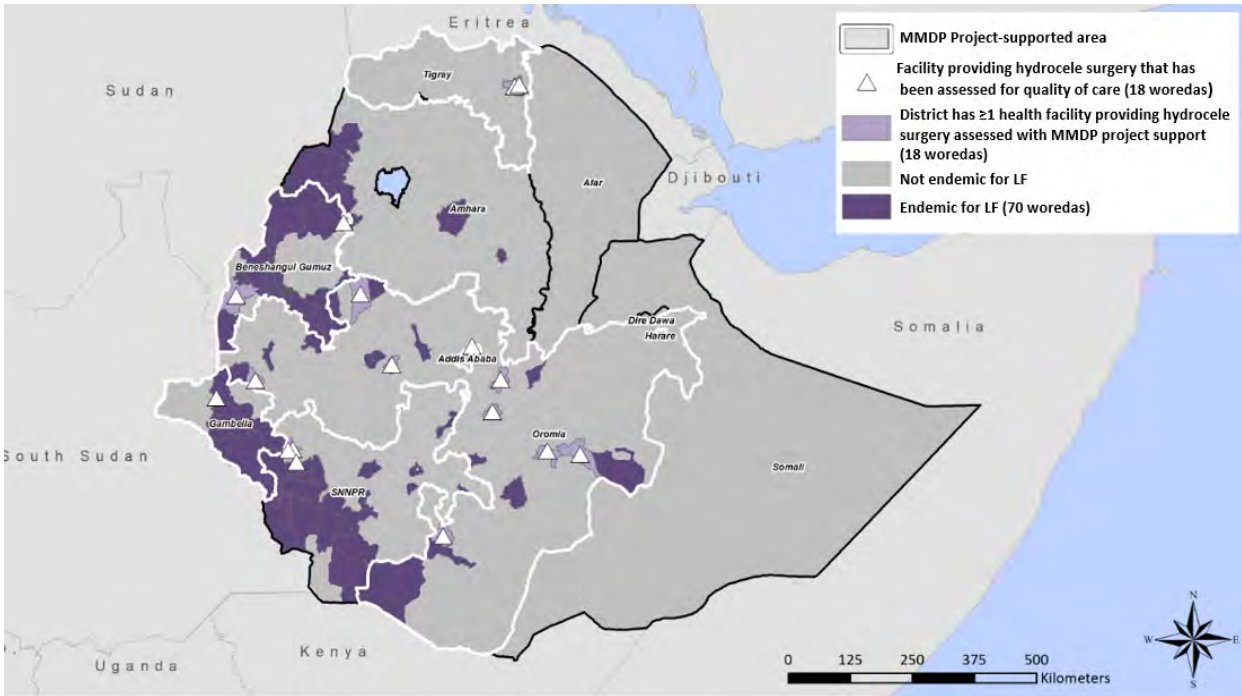


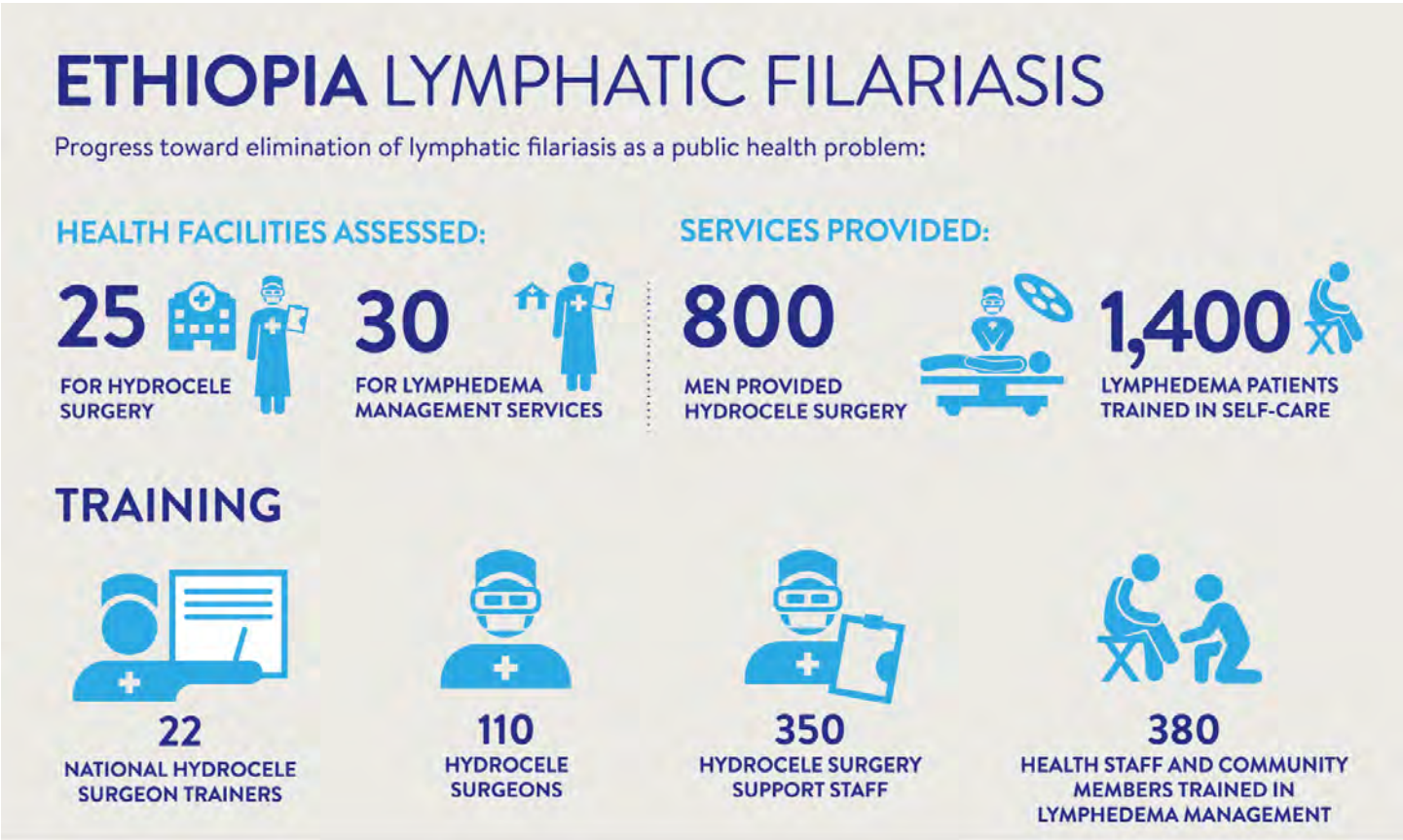
Figure 21: Health Facilities Providing Hydrocele Surgery Assessed for Quality, Ethiopia<sup>1</sup>



<sup>1</sup> The catchment area of an assessed facility may be larger than what is shown on the map.



Key Achievements



Situational Analysis and Burden Assessment Activities

The project supported burden assessments in 35 LF-endemic and six non-endemic woredas, spanning four regions of Ethiopia (Oromia, BG, Gambella, and Tigray regions). The burden assessments supported through the project followed a protocol developed by the FMOH, CNTD, and the MMDP Project in 2016, which was adopted by the FMOH as a national protocol. Laminated color photos of lymphedema and hydrocele cases were used as visual aids during interviews. During the burden assessments, HEWs, supervised by trained clinical health workers and woreda NTD program officers, went door-to-door to collect information on suspected lymphedema and hydrocele patients.

Twenty-two hospitals were identified in consultation with the respective RHBs to provide hydrocele surgeries in MMDP Project-supported areas (one in Tigray, 16 in Oromia, one in Gambella, two in SNNPR, and two in BG). Prior to conducting surgeries, the project conducted a readiness assessment in 18 of the 22 hospitals to assess the degree of readiness of each hospital to provide quality hydrocele surgery services. The tool utilized for these assessments includes questions on the availability of key health personnel (such as surgeons/integrated emergency surgical officers [IESOs], scrub nurses, and anesthetists) and the necessary operating room facilities and equipment as listed in the FMOH Hydrocele Surgical Handbook. Where the hospitals conducted self-assessments, the tool was communicated by email and discussion through phone calls. Pharmacists and operating room nurses, who best know the available supplies, filled out the tool.

The findings of the assessments showed the availability of basic operating facilities, equipment, and personnel in all hospitals. Key gaps observed from these assessments included a shortage of certain consumables/supplies and beds for post-operative stays. These gaps were communicated to the FMOH and to the respective RHBs to address. To enable the hospitals to provide standard hydrocelectomy services as per the FMOH Hydrocele Surgical Handbook, the project and CNTD through the Surgical Society of Ethiopia (SSE) provided consumables and medical supplies that were not available from the Pharmaceutical Fund and Supply Agency stores.

## Capacity Building

To ensure the provision of high-quality LF morbidity management services, the project trained national hydrocele surgeon trainers, hydrocele surgeons, IESOs, clinical health care workers, and nurses. With the invaluable assistance of Dr. Mante of the African Filariasis Morbidity Project, prior to training hydrocele surgeons, the project trained national trainers using the Filaricele Surgery Training Package in combination with the FASTT simulator. Twenty-two surgeons were trained to use the FASTT surgical simulator in their role as national trainers. The MMDP Project-developed Filaricele Surgery Training Package and the Ethiopian FMOH Hydrocele Surgery Training Handbook were used to guide the training, which also included a session on infection control and health care waste management. Following the theoretical sessions, practice was done through a three-step process, wherein the trainers first demonstrated the surgery on the FASTT simulator; then trainers and trainees each practiced the surgery step by step together, and finally the trainees conducted a surgery on the simulator under observation.

The national trainers then trained surgeons and IESOs in the resection technique, also with support from Dr. Mante. The training included theoretical sessions followed by practice on the FASTT simulator. Each trainee conducted at least one supervised hydrocele surgery on one side of the FASTT hydrocele cartridge. The live surgery portion was conducted under the supervision of a trainer. While no global guidelines exist for surgeon certification, the FMOH required that each surgeon operate on at least five patients under supervision before undertaking the resection technique alone.

In addition, the project trained clinical health care workers and nurses on lymphedema management and post-hydrocele surgery management. The objective of this training was to enhance the skills of the clinical health workers in lymphedema management and post-hydrocele surgery follow-up. Half of the training focused on lymphedema management, facilitated by NaPAN, and included a practical session on assessing lymphedema patients and teaching them self-care. The other half of the training was dedicated to post-hydrocele surgery follow-up. The main topics included monitoring for post-operative complications, post-operative care, and follow-up. As part of the training on lymphedema management, clinical workers prepared an action plan to reach lymphedema patients in their respective health facility's catchment area with support from representatives from RHBs and Woreda Health Offices (WoHOs). On their return to their health facilities, the trained clinical health care workers cascaded the training to fellow clinical workers in their health facilities. In addition, they conducted an orientation for HDA members to mobilize and enroll patients for lymphedema management services.

The project collaborated with NaPAN to support lymphedema morbidity management services in 32 woredas in Oromia, Tigray, and BG regions. Clinical workers from these woredas, trained by the project, provided self-care training to lymphedema patients identified through the LF burden assessments. Clinical workers used the HEWs and HAD members to mobilize lymphedema patients within their catchment areas. Those patients then presented at the health centers closest to their location, where the clinical workers provided them with a practical training on limb washing, skin care, proper elevation techniques, and important exercises for swollen limbs. In addition, the project provided washing kits containing a bucket, water, soap, a basin, a towel, and ointment for distribution to patients enrolled in lymphedema management services. Overall, the project trained 1,395 lymphedema cases in self-care.

LF burden assessment training was provided to HEW supervisors and clinical health workers right before the burden assessments. The training covered LF causes and prevention, clinical symptoms, differential diagnosis with staging of disease, basics of morbidity management, and a review of the burden assessment patient identification aid and reporting forms. The trainers used training materials that had been developed by WHO with support from the MMDP Project. The trained supervisors then cascaded the burden assessment training to HEWs throughout the LF endemic woredas.

## Filaricele Surgery Training Package in Ethiopia

As part of its commitment to LF and MMDP, the FMOH has begun the process of integrating the Filaricele Surgery Training Package into the pre-service training of undergraduate medical students, IESOs, and surgical residents. This process started with training national hydrocele surgeon trainers in FASTT, followed by the development of a hydrocele surgery training syllabus, which was endorsed by the SSE. The syllabus was also shared with and approved by the Ministry of Education. The project also rolled out a series of TOTs for medical school instructors to introduce the FASTT and the hydrocele surgery syllabus to 78 students. Instructors from five medical schools (Jimma University, Mekelle University, Hawassa University, Gondar University, and St Paul's Millennium Medical College) participated in the trainings. Furthermore, an advocacy meeting was held during the SSE's annual general meeting and scientific conference in November 2018 to inform the wider audience of surgical practitioners in Ethiopia about LF elimination goals and interventions and to further introduce FASTT.



### Innovation in medical training

To help medical personnel perfect their hydrocele surgery skills on a simulator before operating on patients, the FMOH and the Surgical Society of Ethiopia conducted a systematic advocacy campaign with medical schools. The result: The FASTT simulator and the Filaricele Surgery Training Package developed through the project have been officially integrated into the medical curriculum.

Discussions were held during the life of the project about transferring the FASTT manufacturing technology to Ethiopian stakeholders—namely, the Ministry of Innovation and Technology, the SSE, FMOH, and the Ministry of Education. However, due to unresolved issues concerning intellectual property rights, this transfer was not achieved before the project ended.

### Hydrocele Surgery and Follow-up Activities

In Ethiopia, the project provided hydrocele management services in the regions of BG, Oromia, and Tigray. Surgeries were conducted during campaigns in collaboration with the FMOH, the SSE, CNTD, and the respective RHBs. Flash cards designed as reference materials for the patient and as teaching tools for clinical health care workers and HEWs were distributed throughout the regions. To disseminate messages on the place and date of

the surgery and the fact that the surgery was free of charge, radio messages in local languages were aired ahead of and during the campaigns. This method drew a number of people who had not been identified and registered during the earlier burden assessment exercise.

Prior to the start of the campaigns, clinical workers (nurses and health officers) screened suspected hydrocele cases who had been previously registered during the burden assessments. The screeners gave all confirmed hydrocele patients a specific appointment date for surgery. Patients that were screened for hydrocele but diagnosed with hernia, testicular tumor, or another condition were referred separately to hospitals for treatment after the hydrocele campaign. Trained surgeons and IESOs conducted the hydrocele surgeries at hospitals that had allocated operating tables for the project and blocks for the three-day post-operative hospital admission of the patients. The hospitals also allocated support staff (scrub nurses, anesthetists, laboratory technicians, on-duty nurses, health officers, and janitors). In addition, the hospitals coordinated the provision of meals with subsidized prices to patients, who remained under the observation of trained clinical workers at the hospital for three days.

Efforts were made to follow up on Day 5, Day 7, and Day 14 with all patients that were operated on. As part of this active post-surgery follow-up, trained health workers visited the homes of those who did not make it to the health facility. Those with infections were either cared for at local health centers or referred to a hospital for care. The SSE assigned three urologists and general surgeon consultants to provide oversight for the screening and immediate post-operative follow-up.

At the end of each day during the training and surgical camps, the RHB, RTI, HKI, and surgeons conducted a daily joint debriefing session on the activities. Steps to overcome challenges were identified and acted upon accordingly while planning for the next day. Of the 789 patients who received hydrocele surgery under the project, 90% received follow-up within five days following surgery. A total of 88 patients (11% of the 789 operated cases) received follow-up 6–12 months following surgery.

### SSE leadership

The Surgical Society of Ethiopia, with its well-established credibility, was an important partner in achieving project objectives. Members of the Society played a critical leadership role through advocacy and workshops to promote the integration of FASST into the medical curriculum.

## Progress Towards Elimination

The MMDP Project made significant contributions towards the national goals of meeting LF elimination targets over the course of the project. The project worked to strengthen the country's health system's capacity from the national level to the woreda and community levels to support patients needing hydrocele surgeries and lymphedema management. As a result, the national program now has an important set of tools and strategies that will be crucial to the country as it moves into a phase of elimination dossier development and finalization.

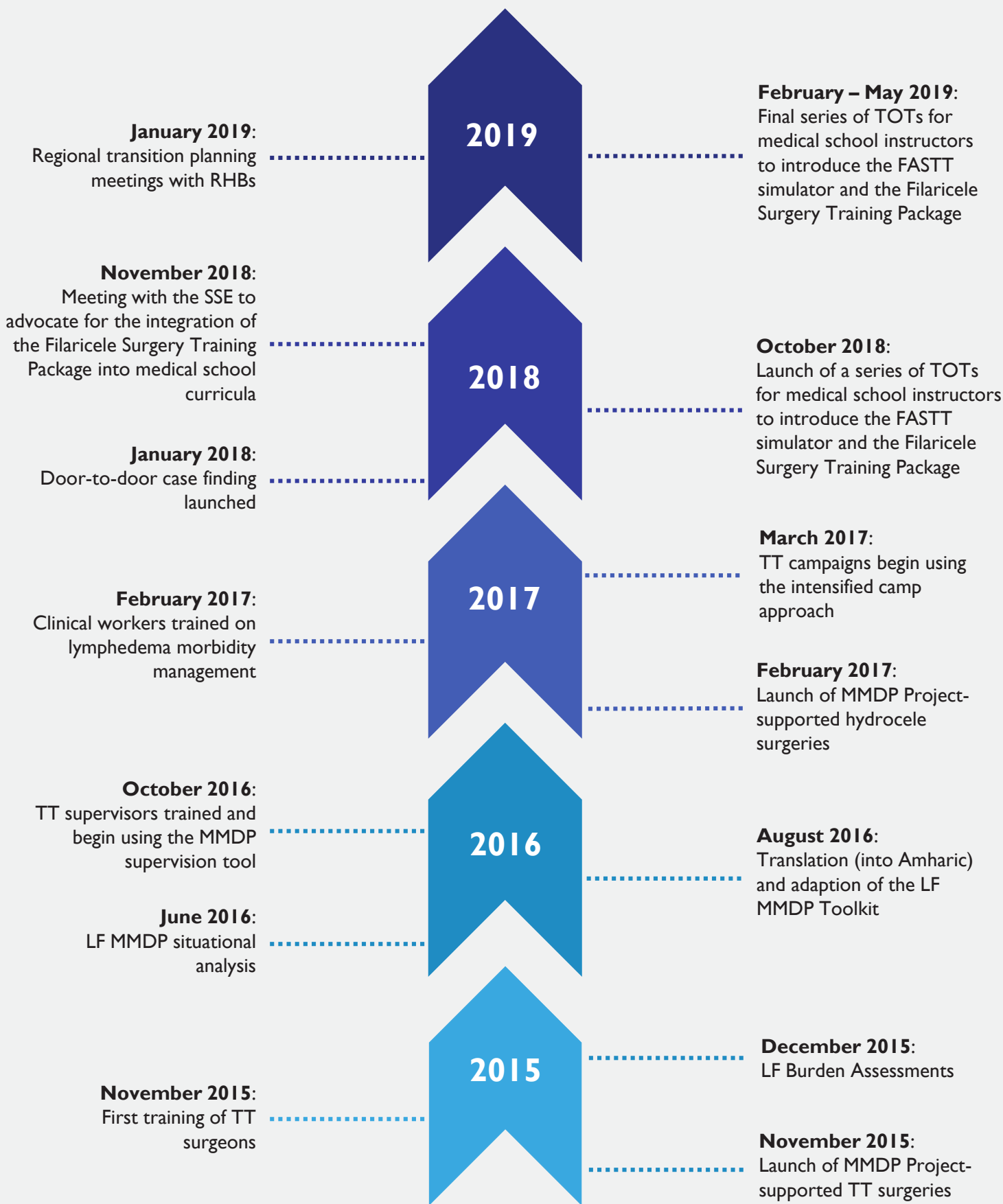
In line with the WHO LF elimination requirements, the MMDP Project worked with existing hospitals in its targeted regions to ensure they had the personnel, capacity, and equipment needed to be considered a reference hospital for hydrocele surgery. Hence, all LF endemic woredas in in these project-supported regions have a reference hospital with trained surgeons where patients with hydrocele can access surgical services. Furthermore, BG and Gambella collectively were able to address roughly 75% of the latest estimated hydrocele burden; Tigray addressed all cases that were identified by patient estimation surveys; and Oromia addressed approximately 33% of the region's estimated hydrocele burden. Through supportive supervision designed to strengthen the quality of hydrocele surgery and lymphedema morbidity management services, and lead to more client satisfaction, the project helped to raise awareness of the importance of quality. The importance of a standardized surgical procedure, prior facility assessment, and ensuring the availability of standard medical commodities was also well accepted by health authorities and practitioners.

Continuous engagement and advocacy to ensure political support and leadership is a critical factor for the success of future progress toward elimination. Strengthened reporting of LF MMDP data as part of regular WHO reporting cycles is also needed. The FMOH will need to continue its strong leadership role, closely managing and coordinating partners, as it did during the MMDP Project.



© William Nsai





# HEALTH SYSTEMS STRENGTHENING

MMDP Project activities strengthen national health systems for the long term, contributing to four of the six WHO health system building blocks.



## SERVICE DELIVERY

**Training health providers and managers in:**

- Global standards for managing trichiasis, hydrocele and lymphedema
- Infection control
- Health care waste management

## HEALTH WORKFORCE

**Expanding national pools of highly trained, quality-focused health providers, including:**

- Trichiasis surgeons
- Hydrocele surgeons
- Post-operative nurses
- Surgical supervisors

## LEADERSHIP AND GOVERNANCE

**Supporting strategic policy-making through:**

- Support for development of national NTD strategic plans and trachoma and lymphatic filariasis action plans
- Advocacy for national adoption of MMDP quality-assurance tools and surgeon training curricula

## HEALTH INFORMATION

**Analyzing surgical quality and health system performance through:**

- Post-operative monitoring of patients
- Supportive supervision of surgeons

**Documenting population health status through:**

- Hydrocele and lymphedema burden assessments
- TT-only surveys

**Assessing readiness of health facilities to provide quality management of lymphedema and hydrocele through:**

- Direct inspection and situation analysis activities





*"I see my role of supportive supervisor as being a mentor, able to pass what I have learned to the surgeons working in the field, and share my experience," - Ophthalmologist Dr. André Bertrand Kengmogne after his supportive supervision training in Cameroon*



## Monitoring, Evaluation, and Learning

The MMDP Project's data collection and reporting processes enabled the project to monitor progress towards objectives, engage in evidence-based decision making, and support national programs in their efforts to eliminate trachoma and LFA. A significant part of the project's focus was to strengthen national capacity to provide high-quality MMDP services and move toward elimination. To achieve this, the project's work included collaborating with countries to collect the data required to plan service provision and to complete their trachoma and LF elimination dossiers. Programmatic data also provided the evidence base for the project's documentation of experiences and lessons learned, which were shared with the global trachoma and LF communities.

From the outset, the project collaborated with national programs to gather the case finding and health facility data required to effectively plan service provision. Case finding strategies for both TT and LF evolved over the course of the project in all three supported countries. Close tracking of TT screening data, for example, resulted in adjustments to outreach strategies—such as transitioning case finding from community-wide announcements and self-presentation to door-to-door mobile screening and surgery by dedicated teams. These door-to-door data informed surgery campaign planning and have the potential to be used in trachoma elimination dossiers. Collection of LF patient estimates also took place through multiple strategies, with the project using the resulting data to plan service provision as well as identify the strengths and weaknesses of each approach to patient estimations.

Through the systematic collection and analysis of data, the project created feedback loops to monitor the quality of services provided with its support. The project collaborated with national programs in Burkina Faso, Cameroon, and Ethiopia to plan and implement post-operative follow-up and supportive supervision of TT and hydrocele surgeries. As part of supportive supervision activities, described throughout this report, the project developed observational checklists for TT and hydrocele surgery to collect quality assurance data. For TT surgery, outcome assessments took place regularly to provide all operated cases with the opportunity to receive a 3-6 month follow-up exam, with key data points regularly monitored to identify any need for adjustments to the program (such as additional training). Surgical audits provided a review of individual surgeon performance, generating data that were combined with supportive supervision data to identify surgeon-specific strengths and areas for further skill building.

Active follow-up of operated cases took place for those receiving hydrocele surgery as well, with the project supporting verification and systematic documentation of post-operative follow-up, particularly within the first five days of surgery and 6-12 months after surgery. Analysis of the resulting hydrocele surgical outcome data was an essential point feeding into the project's quality assurance mechanisms.

This focus on quality—especially strengthening and maintaining the capacity of TT and hydrocele surgeons as countries progress towards elimination—is a critical aspect influencing countries' ability to provide high-quality disease management services and sustain elimination. The project's advocacy to routinely include data-driven quality assurance measures and its demonstration of the feasibility of these measures strengthened delivery of MMDP interventions within countries' existing health structure.

Additionally, the project contributed to the global knowledge base by highlighting key successes and challenges encountered by trachoma and LF programs during their implementation of these quality assurance measures. The project's focus on collecting, sharing, and interpreting data also enabled national programs to generate new epidemiological data, use the results and estimates to plan interventions, and begin compiling data from multiple sources to facilitate elimination dossier compilation. Activities supporting trachoma elimination planning included TAP meetings and elimination dossier workshops, detailed data collection on the coverage of TT services at the sub-district level, and door-to-door TT case finding to generate screening data to complement current burden estimates. These TT case finding and geographic coverage data can be used well past the end of the project to inform planning of future trachiasis management activities and identify future needs for TT-only surveys.

The project also continually supported use of results for evidence-based decision-making by closely tracking new age- and sex-standardized TT data resulting from trachoma surveys in all three countries, and by collaborating with national programs in Burkina Faso and Cameroon to pilot and implement TT-only surveys that adhere to WHO's Tropical Data methodology. Similarly, project support to collect LF patient estimations and pilot key LF data collection tools (namely the DIP, which is used in health facility assessments, and situation analysis tools) informed planning for national LF programs in Burkina Faso, Cameroon, and Ethiopia and generated lessons learned that are relevant to the global LF elimination program.

To ensure efficiency and avoid duplication, the project's reporting process built upon existing NTD and MMDP tools in each country. In collaboration with national programs, additional indicators were designed, refined, and incorporated as needed into all levels of country TT and LF data collection tools to capture project-supported disease management activities. In addition to collecting data that informed MMDP activities and can be used by countries in their trachoma and LF elimination dossiers, in its early years the project built a District Health Information System 2 (DHIS2) database to store and facilitate reviews of country-level indicators





© William Nsai

at various levels. While most national program data collected with project support were ultimately shared offline, as electronic national data systems were still in the process of being fully built out during much of the MMDP Project, the project contributed to in-country discussions of key indicators for ministries of health to consider incorporating into their national data management systems and/or databases.

In Cameroon, following discussions with the project, the national program is considering integrating indicators tracking the number of people receiving TT surgery, number of people receiving hydrocele surgery, and number of lymphedema cases managed into its integrated NTD database. In Ethiopia, the national program has included in its health management information system data three MMDP indicators that are reported quarterly by hospitals and health centers: number of hydrocele cases operated (due to LF) by age; number of lymphedema cases managed; and number of people with TT receiving corrective surgery by age and sex. In Burkina Faso, the country's integrated NTD database currently stores NTD data and is used to generate certain reports (such as the WHO Epidemiological Data Reporting Form), but further discussions with the national program are needed to determine the extent to which the morbidity indicators tracked under the project are integrated into the database.

Finally, as the USAID flagship project for NTD morbidity management, the MMDP Project leveraged key data indicators and its broader experiences to document and share knowledge and lessons learned from the project's TT and LF activities. In addition to sharing this information with global coordination groups and during international meetings, the project developed or contributed to multiple tools, resources, and publications addressing key topics in TT and LF morbidity. The project's support of two trachoma operational research initiatives constitutes another key contribution to advancing the global learning through collaboration with local and international partners. The first initiative explored how taking photos of operated eyelids can be used to predict TT surgical outcomes and potentially serve as a capacity strengthening tool for surgeons. The second initiative researched a promising new technique for post-operative TT surgery developed by Johns Hopkins University. For additional details regarding these knowledge-sharing activities and operational research initiatives, see the *Key Global Contributions* section. For a list of the TT and LF materials produced under the project, see the *MMDP Project Resource Guide*.

# Operational Aspects

## Finance and Procurement

**Procurement:** The majority of the procurement using USAID funds was for the HEAD START simulator and the FASTT simulator. Other items included TT surgical kits, epilation forceps, and other surgical supplies, listed in Table 2.

Table 2: MMDP Project Procurement (USAID-supported)

Item	Quantity
HEAD START base	35
HEAD START orbit	200
HEAD START eyelid	6,377
FASTT base	40
FASTT cartridge	664
TT surgery kits	1,305
Epilation forceps	2,804
Optivisors	15
Autoclaves	22
Hydrocele kits	8
TT clamps	800

**Public-private partnership:** The project’s support to countries for MMDP implementation scale-up and quality improvement was enhanced by leveraging public-private partnerships for goods and services. Supplies such as sutures and pharmaceuticals (namely Tetracaine), valued at approximately \$70,000, were provided in kind from different companies in support of the project’s activities.

**Cost share:** The cost share reported at the end of the project is \$2,877,914. Principal sources for cost share contributions included:

- \$200,000 of in-kind contributions from the Burkina Faso and Cameroon MOHs (e.g., vehicles for campaigns and follow-up); contributions from private funds and other non-U.S. Government sources from RTI, FHF, and LFTW for Ethiopia activities and from Sightsavers for Cameroon (combined total exceeds \$2,700,000);
- the END Fund (approximately \$90,000);
- HKI Private Funds (approximately \$20,000);
- King Philanthropies Fund (approximately \$20,000); and
- contributions from the private sector, described above.

## Environmental Mitigation Plan and Annual Reporting

Given the health care waste that is created by surgical activities, the project developed an Environmental Mitigation and Monitoring Plan (EMMP) to provide a standardized protocol for biological and hazardous waste management and infection control practice across the MMDP Project’s activities. The project’s EMMP prioritized health care waste management and infection control training, assessment of waste disposal capacities, and supply chain management of consumables.

To aid in complying with these standards, the project worked with national programs to develop a checklist that aligned with the MMDP Project’s EMMP standards and national health care waste management practices to use in hospitals and health centers in project-supported areas. The project trained supervisors and surgeons on the policies outlined in the EMMP and familiarized them with the checklists. Environmental management monitoring was then systematically integrated into supportive supervision activities in all three countries. Compliance with the EMMP was monitored via annual reporting from the country teams to USAID. These reports summarized mitigation measures taken by the country as well as any successes or challenges experienced.

Challenges did arise with the implementation of the EMMP protocol. Some countries had constrained capacities for hazardous waste disposal, particularly challenges accessing incinerators, so health staff needed to travel to the nearest incinerator in order to properly dispose of the waste. To address this challenge and to reduce the risk of environmental contamination, the project supported advocacy efforts at the national level to improve the health care waste management capacity within the health system.

Annual reporting revealed that segregation of contaminated and non-contaminated waste was not routinely practiced in some health centers in Cameroon. In response, during refresher trainings of surgeons and nurses the project reinforced the practice of systematically segregating contaminated and non-contaminated waste in the operating room.

### Public-private partnerships

Generous contributions of 3,000 units of Tetracaine from Alcon and more than 4,000 coated vinyl sutures from Ethicon contributed to the high quality of program activities in all three countries and filled an important gap in resources.







## Challenges and Lessons Learned

During the course of the five-year project, the priorities of the MMDP Project remained firmly with the intermediate results previously cited in this report. From the beginning, the focus was on supporting MOHs in their scale-up of programs addressing the morbidity and disability associated with trachoma and LF, positioning the countries to have the data necessary for eventually submitting their dossiers for validation of elimination. Of the three morbidity issues associated with trachoma and LF, the most attention went to trichiasis, with hydrocele and lymphedema placing in second and third order of priority. The focus remained on the three original countries (Burkina Faso, Cameroon, and Ethiopia) and although there was an effort to provide technical assistance beyond these countries, time and resource constraints forced the project to limit its external technical assistance and prioritize close monitoring and systematic follow-up of activities in the three original countries.

As new scientific findings were released, the project evolved, developing additional resources for preferred practices and working with national programs to adapt updated WHO approaches to the local context to ensure that the national programs reflected the latest thinking. Examples included findings such as the fact that the Trabut surgical technique for TT had fewer post-operative complications, especially post-operative TT; the change of the TT threshold from 0.1% among the entire population to 0.2% among adults 15 years of age and older; promoting epilation as a viable TT management tool; and advocating to MOHs to use the age and sex-standardized (or “adjusted”) TT prevalence generated by Tropical Data.

Similar examples exist where the project refined and finalized LF morbidity management approaches based on WHO preferred practices. This includes the focus on the resection technique as the preferred treatment for hydroceles; the programmatic planning for and treatment of co-existing hernias with hydroceles; and the promotion of standardized training packages for hydrocele surgery and lymphedema management.

**Resource constraints:** Resource constraints within each country were and will continue to be a factor. The competing priorities for the few ministry staff available—often working on several NTD projects from multiple donors at the same time—meant that some activities were delayed. For example, bringing stakeholders together to develop long-range plans and to work on the elimination dossiers did not always happen in a timely manner. This situation is not unique to the three countries supported by the project and creative solutions are being found. Solutions include additional advocacy to ensure that community leaders as well as health personnel at the district and lower levels understand the importance of managing the morbidity associated with TT and LF and are fully engaged in seeking out cases, reserving health care providers and facilities for campaigns when needed, and investing

in the quality assurance measures for maximum, longer-term impact.

TT management activities placed significant time demands on a small pool of technical staff who are needed to provide TT surgery, conduct technical supervision of surgeries, and/or participate in post-operative follow-up. In addition, these same staff have other professional responsibilities in addition to TT management. Where possible, the project responded to this challenge by training additional technical supervisors, and by having technical supervisors play a “double role” of both operating and supervising during campaigns that had more limited staffing. Non-surgical resources were also in high demand, with ministries of health forced to balance both the MDA and MMDP components of elimination activities.

**Security and physical access:** Security and physical access in project-supported areas posed a challenge during implementation of project activities. Over the five years of the project, the three countries experienced civil unrest, extremist insurgency, and/or regional conflict. Insecurity posed a direct threat to the safety of project staff and participants, limiting the mobility of both health care personnel and the population for treatment activities. Since insecurity was a consistent challenge, the project developed strategies to allow project activities to continue while still protecting the safety of patients and staff.

For example, in Ethiopia, civil unrest was prevalent in the project-supported regions of Oromia and BG. To address this issue, the national program targeted trainings to improve implementation capacity at the community level. IECWs were trained to perform screening for trichiasis, and supportive supervision training was conducted with staff at the zonal level. This allowed local staff to continue implementing activities in their communities even if staff from the regional or national level could not access them. In addition, the FMOH began implementing mini-camps rather than full surgical camps in areas experiencing periodic insecurity. These strategies allowed the national program to target areas during periods of relative security and prevented cancellations of larger outreach camps when localized insecurity was a concern.

In Cameroon, the Far North region experienced insecurity due to incursions by Boko Haram, a terrorist group based in Nigeria. As a result, activities in Kolofata, Touboro, Meri, and Mokolo districts were periodically disrupted over the life of the project.

And Burkina Faso has recently experienced increased insecurity as a result of regional conflict and insurgency. Concerns of insecurity have been mounting in the Center North region of the country since January 2019. In response to the evolving situation, the project worked in tandem with the MOH to reschedule activities when the situation improved and cancelled activities in



areas that were declared “no travel” zones. Physical accessibility to project-supported areas was also sometimes impeded by roadway and weather conditions, particularly during the rainy season. In periods with heavy rainfall, roads could be washed out entirely or become too precarious for project staff to travel. To avoid delays in implementation, project activities were scheduled to avoid peak periods of the rainy season.

#### **Applying global guidance to new epidemiological contexts:**

An ongoing theme during implementation was to ensure that global standards and preferred practices were promoted in each setting even though some of the epidemiological contexts were constantly evolving, presenting additional challenges. As described below, the MMDP Project carefully documented issues and solutions, many of which may prove useful to other NTD programs.

*TT data:* To increase the confidence that a program has achieved the elimination target, tracking the geographic coverage of services is recommended. Tracking where services have been offered and ensuring that the entire population of a district has had access to trichiasis management helps build the case that there is no more work to do beyond establishing the necessary fixed services to manage cases below the elimination threshold and incident cases.

The project developed a geographic coverage tool to assist programs to document outreach services to the level of health areas. This is a good example of a tool that programs can use to capture the same information at an even lower level of the system and help contribute data for the elimination dossiers. The project also developed a two-page document explaining how to develop a geographic coverage tool titled *Tracking Geographic Coverage of TT Management Services* (see the *MMDP Project Resource Guide*).

*TT case finding:* The MMDP Project encountered challenges in countries entering “the last mile,” when only a small number of cases must be addressed before the criteria for elimination are met. As the project supported national programs in finding those last cases, particularly in districts where trichiasis management services have previously been provided, in several circumstances the latest trachoma epidemiological surveys generated a much higher number of estimated trichiasis cases than program staff could find at the community level. Since these survey estimates are crucial in demonstrating evidence of progress towards elimination and in guiding planning of where to provide intensive TT management services, these scenarios led the project and its partners to explore systematic door-to-door case finding (rather than more traditional social mobilization efforts such as town criers and radio spots) as a potential means of attempting to align case finding results with survey data.

In sharing its case finding experiences with other trachoma programs in international fora, the project contributed to the global discussion of how programs should handle the challenge

of demonstrating evidence of progress towards elimination when theoretical cases are challenging to find. The global discussions around this challenge have resulted in door-to-door case searches becoming an additional option to consider for assessing whether the elimination prevalence target for trichiasis has been reached (per the November 2018 Global Scientific Meeting report). To facilitate compilation of strong case finding data that can serve this purpose, a key lesson learned from the project’s experience is the need to develop clear protocols for systematically collecting detailed screening data as it relates to the population of a district from the outset, and to consider adjusting campaign geographic coverage targets to reflect depth rather than breadth of coverage.

*Age and sex standardization:* At the start of the project, one of the challenges to the elimination of trachoma as a public health problem was the fact that much of the available data for trichiasis were underpowered, with overestimates often leading to the mobilization of resources for outreach that would not find the expected cases and underestimates catching programs unprepared. To help address this issue, WHO’s Tropical Data platform now generates adjusted TT prevalence rates that have been standardized by age and sex. This adjusted prevalence accounts for the fact that TT is more common among those 40 years old and older and more common in women. Efforts have also been made to standardize older data, providing the surveys were robust enough to allow for the adjustment. The challenge the project encountered was the justification to the MOH of age and sex standardization as well as the need for MOH staff uptake of Tropical Data training to access these results. This was particularly important when the difference between unadjusted and adjusted data straddled the threshold indicating whether intensive intervention was warranted or not.

*TT surgery follow-up:* The project’s regular implementation of outcome assessments and surgical audits as an integral part of its broader quality assurance strategy for TT surgery illustrates how it is feasible for trachoma programs to systematically incorporate these activities into their services. However, conducting a follow-up exam for all operated cases 3-6 months after surgery (in line with global guidance) was a challenge for the project, particularly in larger-scale contexts with a high number of surgeries and/or where a decentralized approach to service provision through outreach campaigns results in a very large number of surgery sites spread over a sizeable geographic area. Trichiasis surgeons are a specialized cadre of health worker and managing their time across activities can be a challenge as the surgeons conducting this follow-up are the same ones required for TT surgery at outreach campaigns—and they often have additional duties within the health system.

In addition, finding people 3-6 months after surgery is often challenging due to a range of factors including population movements and inaccessibility of certain geographic areas, particularly during rainy seasons. To help mitigate this challenge,

the project collaborated with national programs to maximize the number of patients who can be reached at a time (when a surgeon travels to a particular area). Going forward, as trachoma programs continue to refine their follow-up strategies, budgeting the time, staff, and financial resources needed to conduct follow-up at this scale will be essential—and includes the training needed to develop a sufficiently large pool of qualified surgeons, auditors, and technical supervisors.

*LF morbidity data:* A challenge many countries face in strategically managing morbidity due to LF (and to prepare and submit their dossiers for validation of elimination) is the lack of epidemiological data on the morbidity burden and distribution of disease, especially at the implementation unit level. The approaches used vary greatly based on country context, and the project's support of piloting several different methods for collecting patient estimates have helped call attention to important questions such as:

- *Who should collect the estimates, given that more specialized medical staff may be more likely to accurately identify cases, but community-level actors (who often do not have a clinical background) are extremely valuable in expanding reach into a community?*
- *How can programs balance the trade-off between collecting data in a way that is most likely to reach those who are often housebound or less likely to engage in community activities (for example, through door-to-door approaches, which are often time- and resource-intensive) versus at more centralized sites (such as community meeting places or health facilities), which are often logistically practical but where people are less likely to self-present at these locations because of social stigma or due to their hydrocele or lymphedema limiting their mobility?*

**Integration of LF morbidity management into the health system:** Compared to TT management activities, the integration of lymphedema management and hydrocele surgery into the health system proved to be challenging across all three countries as limited staffing and resources made it difficult to provide the same level of support for the critical activities of supportive supervision and patient follow-up at regular time intervals. Existing health center staff and community health workers are generally overburdened and often unable to fully or even partially incorporate additional demands on their time.



© William Nsai



## Promising Practices and Recommendations

### Cross-partner Coordination with WHO

A key practice for effectively managing morbidity due to NTDs is the need for developing and maintaining strong partnerships. During its five-year tenure, the project focused on including a wide range of governmental, non-governmental, and academic organizations in planning and implementation, recognizing that morbidity management, particularly with the objective of elimination as a public health problem, is a complex task that requires multiple stakeholders working in a collaborative and coordinated fashion.

One of the critical stakeholders that the MMDP Project fostered a partnership with is WHO, which has the global responsibility for promoting and validating NTD elimination efforts. This was particularly true with the LF program within WHO's NTD department. The project acted as the secretariat for the WHO-led Monthly Morbidity Management Meeting (MMMM) that brought together representatives from the Christian Blind Mission's (CBM) Disease Management, Disability, and Inclusion Working Group, CDC, END Fund, HKI, GAELF, LSHTM, RTI, Sightsavers, USAID, and WHO among others. The primary purpose of this monthly meeting of LF actors is to maintain a community of stakeholders to provide updates on individual organization activities and experiences, to share successes, to discuss ongoing needs and challenges, and to advance the global WHO morbidity agenda of eliminating LF as a public health problem. While several groups bring together trachoma stakeholders on a regular basis, the value of MMMM, compared to the trachoma groups, is that it is the one consistent forum that allows for a high level of engagement on a monthly basis. LF morbidity does not generate the same level of funding as trachoma and thus partners engaged in activities are much fewer. Having a mechanism such as the MMMM promotes the harmonization of approaches and leveraging of knowledge and experiences.

An example of an output from the MMMM is the WHO LF MMDP Toolkit (see the *Key Global Contributions* section). Countries can use or adapt this overall package of tools and templates to implement key activities needed to strengthen health system delivery of the recommended minimum package of care for LF patients.

### Global Surgery 2030

Global Surgery 2030 is an initiative that was launched by the Lancet Commission on Global Surgery in 2014 to address the lack of international attention to the need for improved development and delivery of surgical and anesthesia care in Lower- and Middle-Income Countries. In developing global and country-level programs, the MMDP Project made it a point to position trichiasis and hydrocele surgery in the framework presented by the Lancet Commission, with a focus on capacity strengthening

and global indicators. This was especially evident through the project's significant contribution to the newly-released WHO Surgical Approaches to the Urogenital Manifestations of Lymphatic Filariasis informal consultation report (2019), which also cites tools developed by the MMDP Project. This report provided a crucial update for practitioners and program planners as the last WHO report on this topic was published in 2002. Implementing agencies should position their work within global frameworks such as those presented by WHO and Global Surgery 2030. These frameworks provide a realistic check on the work being pursued and allow implementing agencies to consistently inform overall global progress.

### Programmatic Innovations

The project was on the forefront of conceptualizing, developing, and testing various approaches to enhance the quality of surgical outcomes for both trichiasis and hydrocele. Two areas that the MMDP Project aggressively promoted for both trichiasis and hydrocele surgery were infection control and health care waste management. The project strongly recommends i) building all aspects of infection control and health care waste management into trachoma and LF morbidity programs and ii) raising awareness among other surgical programs within a national health system of how to integrate these elements into their work as part of overall health systems strengthening. Planning is also an integral part of successful programs. The project developed procurement calculators in English and in French to assist national programs and implementing partners in developing accurate budgets based on projected surgical output. Calculators are available for trichiasis surgery and hydrocele surgery. A third calculator was developed to calculate supplies needed for lymphedema management. The project recommends programs incorporate these calculators into their planning, updating the tools as needed.

**Trachoma:** As described in the *Key Global Contributions* section and summarized in the *MMDP Project Resource Guide*, the project developed a number of resources for improving TT management. Although some of the resources such as the Training Trichiasis Surgeons for Trachoma Elimination Programs manual may not need further review or revision, the project does have recommendations for two of these resources:

**Epilation:** In recent years, more emphasis has been put on management of trichiasis and not just on surgery. Recognizing that i) some cases of trichiasis may not merit surgery and ii) for some people surgery is not acceptable and epilation provides an alternative solution, the project developed guidelines and educational materials (*Epilation Counseling and Guidance*) for how to safely and effectively epilate those lashes that are touching the globe. In Cameroon where epilation is an approved practice, the project also made forceps available to distribute to those who

preferred epilation. As there are still countries concerned that the availability of epilation will discourage people from electing to have surgery, the project recommends additional research to prove or disprove this notion.

*Photo taking:* Based on its work with photo taking (see *Key Global Contributions*), the project has three recommendations: i) continue to test the use of photo taking as a potential way to improve surgeons' technical skills; ii) develop a set of indicators for measuring the impact of reviewing photos on surgeons' performance; and iii) test the full utility of this approach to determine if and how it can be used in supervision, prioritization of cases for post-surgery follow-up, the design of training, and other potential activities.

**LF:** One of the more significant resources that the MMDP Project developed and put into practice was the FASTT, a surgical simulator for hydrocele surgery using the resection technique. (See the *Key Global Contributions* section.) This training tool provides an opportunity for hydrocele surgeons to hone their surgical skills on an inanimate object before they perform live surgery on a patient. Using FASTT in medical training is included as a chapter in the Filaricele Surgery Training Package developed by the project.

The project recommends i) conducting additional research to determine the extent to which FASTT leads to changes in surgical outcomes; ii) exploring in other contexts and countries the institutionalization of FASTT into medical training curricula; iii) identifying other opportunities for the local manufacture of FASTT; and iv) if research does further confirm the effectiveness of the simulator, developing a cadre of master trainers that can provide assistance to countries.



© William Nsai



# Conclusion

At the country level, a strong commitment from national NTD programs in Burkina Faso, Cameroon, and Ethiopia, supported by dedicated efforts from the partners comprising the MMDP Project team, resulted in an expanded and better-trained human resource pool for providing quality MMDP services and the adoption of internationally recognized preferred practices for morbidity management for trachoma and LF. Scaled-up MMDP implementation, strengthened data systems, forward movement on elimination dossier planning and preparation, and most importantly, thousands of lives improved demonstrate the effectiveness of five years of sustained effort in each country. Hallmarks of the project’s approach were inclusion and country ownership from the national level to the community level, a sustained emphasis on ensuring quality for all aspects of MMDP, and a focus on data-driven decision making.

Globally, the MMDP Project team, with significant contributions from national programs, other organizations, and experts in trachoma and LF, developed tools and resources to support the ongoing provision of high-quality TT and LF morbidity management services. By documenting lessons learned, investigating promising practices, and sharing knowledge widely, the MMDP Project strengthened capacity, improved data availability and use, filled gaps in the trachoma and LF knowledge base, and supported WHO’s NTD program.



Founded in 1915, Helen Keller International is dedicated to saving the sight and lives of the most vulnerable and disadvantaged. We combat the causes and consequences of blindness and malnutrition by establishing programs based on evidence and research in vision, health and nutrition. We currently have more than 100 programs in 20 African and Asian countries, as well as in the United States.





*"After the operation, the pain was gone, and my sight was good. Now I work in the farm, and I take care of the household perfectly." - Fanta, following her trichiasis surgery in Cameroon*



## MMDP Project Achievements: Trichiasis Management (USAID-Supported)

	Burkina Faso					Cameroon					Ethiopia				
	FY16	FY17	FY18	FY19	Life of Project Totals	FY16	FY17	FY18	FY19	Life of Project Totals	FY16	FY17	FY18	FY19	Life of Project Totals
<i>Number of people:</i>															
Examined for TT	7,786	94,467	71,975	55,708	229,936	15,556	252	110,521	48,827	175,156	127,618	424,809	401,592	829,718	1,783,737
Confirmed with TT	258	1,171	701	367	2,497	469	90	288	136	983	13,950	30,801	22,161	7,995	74,907
Provided TT surgery	164	943	538	288	1,933	445	88	241	113	887	12,883	28,748	20,034	7,250	68,915
Referred for surgery for age < 15 years	-	-	-	-	-	6	-	10	1	17	83	170	155	37	445
Referred for surgery for lower eyelid TT	7	38	34	19	98	1	-	-	-	1	204	549	393	131	1,277
Referred for surgery for post-operative TT	24	83	13	7	127	1	-	25	-	26	77	207	157	41	482
Refusing TT surgery	5	44	48	20	117	24	2	47	22	95	174	1,099	1,227	499	2,999
Counseled in epilation	13	23	66	33	135	24	2	8	12	46	139	372	337	196	1,044
<b>Number of people receiving surgery or otherwise made known to the health system*</b>	176	1,025	620	327	2,148	470	90	288	135	983	13,261	30,396	21,654	7,880	73,191
<b>Number of people receiving surgery or otherwise made known to the health system (life of project)</b>											<b>76,322</b>				

\*Includes those who received surgery, those who refused surgery, and referrals for lower eyelid trichiasis. (Definition changed in late FY19 to remove referrals for those < 15 years of age.)

## MMDP Project Achievements: Lymphatic Filariasis (USAID-Supported)

	Burkina Faso				Cameroon				Ethiopia			
	FY16	FY17	FY18	FY19	Life of Project Totals	FY15	FY16	FY17	FY18	FY19	Life of Project Totals	Life of Project Totals
<b>Lymphatic Filariasis (LF) Disease Management Services (# People)</b>												
Hydrocele Surgeries Provided	23	327	668	150	1,168	-	-	37	106	-	143	789
Lymphedema Patients Trained in Self-Care	-	678	-	-	678	-	-	75	-	-	75	1,395
<b>LF Burden Data Collection* (# Districts)</b>												
Data collected through Transmission Assessment Surveys (TAS 1,2,3) or Pre-TAS	31	-	-	-	31	27	86	12	-	-	125	-
Data collected through Mass Drug Administration (MDA) Registration/Coverage Surveys	-	-	-	-	-	43	-	-	-	-	43	37
Data collected through Other Project-Supported Method	-	8	12	-	20	-	-	5	-	-	5	-
<b>Total Districts with MMDP Project-Supported Burden Data Collection</b>	<b>31</b>	<b>8</b>	<b>12</b>	<b>-</b>	<b>51</b>	<b>70</b>	<b>86</b>	<b>17</b>	<b>-</b>	<b>-</b>	<b>173</b>	<b>37</b>
<b>Facility Assessment** (# Facilities)</b>												
Facilities Providing Hydrocele Surgery Assessed	4	4	-	-	8	-	4	-	-	-	4	20
Facilities Providing Care for Lymphedema Assessed	18	20	-	-	38	-	24	-	-	-	24	29

\*Life of Project Totals across all fiscal years may count the same district more than once if the district collected burden data in multiple fiscal years.

\*\*As the same facility may provide both hydrocele and lymphedema management services, the facilities are not added together to create a total number of facilities.



## MMDP Project Achievements: USAID-Supported Trainings (Trachoma and LF)

	Burkina Faso			Cameroon				Ethiopia				Life of Project Total	
	FY16	FY17	FY18	FY19	FY16	FY17	FY18	FY19	FY16	FY17	FY18		FY19
TT Surgeon Training													
National TT surgeon trainers trained	3	3	3	-	2	2	-	-	24	-	-	-	37
TT surgeons (non-trainers) trained	12	7	5	-	10	-	-	-	104	46	19	19	222
TT surgeons (trainer & non-trainer) receiving refresher training	-	6	-	-	-	4	7	3	-	37	2	-	59
Total number of TT surgeons trained	15	16	8	-	12	6	7	3	128	83	21	19	318
TT surgeons certified	9	3	3	-	10	-	-	-	101	42	19	8	195
TT supervisors trained	6	3	3	-	2	8	-	-	14	33	44	-	113
Additional TT Trainings													
People trained in TT campaign/outreach management	294	168	97	-	37	14	18	14	-	-	-	-	642
TT case finders / community mobilizers trained	1,386	800	942	-	1,195	450	799	174	5,480	2,958	1,336	1,875	17,395
People trained in trachoma survey methodology	1	-	-	-	3	16	16	10	-	-	-	-	46
Total number of people receiving TT-related trainings	1,711	990	1,053	-	1,259	494	840	201	5,723	3,116	1,420	1,902	18,709
Hydrocele Surgeon Training													
National hydrocele surgery trainers trained	3	-	-	-	2	-	-	-	-	12	-	10	27
Hydrocele surgeons (non-trainers) trained	12	76	5	-	-	7	-	-	-	26	6	80	212
Total number of hydrocele surgeons trained	15	76	5	-	2	7	-	-	-	38	6	90	239
Hydrocele surgery supervisors trained	3	-	-	-	-	-	-	-	-	-	-	-	3
Health staff (non-surgeon) trained in hydrocele surgery support	11	43	2	-	-	25	-	-	3	227	87	28	426
Lymphedema Management Trainings													
Health staff (regional, or district) trained to conduct lymphedema management trainings	294	158	-	-	-	93	-	-	105	207	40	32	929
Community members trained to identify and refer lymphedema cases	1,978	-	-	-	-	-	-	-	-	-	-	-	1978
Community health workers and/or caregivers trained in lymphedema management (washing and care)	-	1,189	-	-	-	48	-	-	-	-	-	-	1237
Additional LF Trainings													
People trained to conduct LF MMDP burden assessments	-	-	-	-	-	-	-	-	343	892	-	-	1235
Total number of people receiving LF-related trainings	2,301	1,466	7	-	2	173	-	-	451	1,364	133	150	6,047

## The Morbidity Management and Disability Prevention Project

### Resource Guide

Publication	Description	
<b>Trachoma</b>		
<b>Training Trichiasis Surgeons for Trachoma Elimination Programs</b> (English and French)	This preferred practice manual for trainers of trichiasis surgeons contains information to help a trainer prepare for and lead a training workshop. The manual is intended to facilitate and standardize the process and quality of training new trichiasis surgeons and trichiasis surgeons who undergo refresher trainings.	
<b>Procurement Calculator for Trichiasis Management</b> (English and French)	This calculator quantifies the amounts of drugs, disposable materials, and durable goods needed for quality trichiasis management. The calculator is designed for both Trabut and BLTR methods of surgery.	
<b>Photographing Eyelids Before and After Trachomatous Trichiasis (TT) Surgery: A Resource Package</b> (English and French)	This package highlights the use of photo taking before and after trichiasis surgery to help surgeons, technical supervisors, and national programs improve TT surgical quality. Contents include how to photograph eyelids and how the photos can support surgeon skill strengthening.	
<b>Epilation Counseling and Training Guidance</b> (English and French)	This two-page guide contains guidelines for providing epilation counseling to trichiasis patients who decline surgery, where forceps are provided for epilation as an alternative TT management strategy.	
<b>Tracking Geographic Coverage of TT Management Services</b> (English and French)	This two-page document explains how to develop a tracking tool to assess relative geographic coverage of trichiasis management services within a defined area.	
<b>Lymphatic Filariasis</b>		
<b>Filaricele Surgery Training Package</b> (English)	This training package provides instructional materials, including videos, for conducting hydrocele surgery. The package includes optional modules on usage of the FASTT surgical simulator.	
<b>Procurement Calculator for Hydrocele Surgery</b> (English and French)	This calculator quantifies the amounts of drugs, disposable materials, and durable goods for high-quality hydrocele surgery. The calculator includes a provision for hernias.	
<b>FASTT Simulator: Manufacturing Manual</b> (English)	This manual provides detailed, step-by-step instructions, complete with photos, for manufacturing the Filaricele Anatomical Surgical Task Trainer, also known as FASTT. The FASTT is a hydrocele surgery simulator that allows surgeons to hone their skills on an inanimate object before conducting surgery on a live patient.	
<b>Procurement Calculator for Lymphedema Management</b> (English and French)	This calculator quantifies the amount of drugs and supplies needed for high-quality lymphedema management and to treat acute attacks.	
<b>Lymphedema Management Video</b> (English and French)	This video and accompanying guide (with handouts) provides supplementary instructional materials for community health workers and other trainers conducting a training on lymphedema management.	
<b>Lymphatic Filariasis Patient Identification Job Aid</b> (English)	This two-page, illustrated guide provides guidelines for identifying cases of lymphedema and hydrocele in the community.	



## Appendix C: Key Partners

The MMDP Project benefited from close collaboration and coordination with a number of technical partners in both trachoma and lymphatic filariasis who contributed significantly to the overall program. Their roles are summarized in the table below.

Organization	Role
Ministry of Health of Burkina Faso, Ministry of Health of Cameroon, Federal Ministry of Health of Ethiopia and Regional Health Bureaus	Ministries of health planned and implemented all country initiatives in support of the national NTD programs in each of the three countries. This required regular and close coordination throughout the life of the project.
RTI	In-country implementation of the MMDP Project in Ethiopia, including: 1. Capacity-building for the Federal Ministry of Health 2. LF morbidity activities 3. TT activities in Oromia region through sub-recipient Fred Hollows Foundation 4. TT activities in Tigray region through sub-recipient Light for the World
African Filariasis Morbidity Project (AFMP)	Contributed technical expertise in hydrocele surgical training and lymphedema management, including: adaptation of training materials and supervisory tools for hydrocele/hernia surgery in targeted countries; support of LF M&E efforts conducted by MOHs; TOT in hydrocele/hernia surgery; and expertise for the design, development, and piloting of a hydrocele surgery simulator: FASTT.
Kilimanjaro Centre for Community Ophthalmology (until September 2015)	In the initial phase of the project, served as a technical resource for the planning, implementation, and M&E of trichiasis surgical services. Provided technical assistance in adapting and implementing preferred practices for TT management.
Sightsavers	Sub-awardee for implementation of TT activities in the Far North region of Cameroon.
WHO: Department of Control of Neglected Tropical Diseases and the Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)	Provided ongoing technical guidance on trachoma and LF-related matters; served on the LF and the trachoma Technical Advisory Boards. Collaborated with the project on the development of many of the publications listed in Appendix B: MMDP Project Resource Guide.
CDC	Provided technical guidance on LF-related work, including the development of publications; served on the project's LF Technical Advisory Board.
GAELF	Provided technical expertise and resources in LF; the Chair of GAELF also served as Chairperson of the project's LF Technical Advisory Board.
UNC	Implementation of the post-operative trichiasis surgery study in Ethiopia and the development of technical resources and publications. Additional collaboration included membership on both the project's Trachoma (Chairperson) and LF Technical Advisory Boards.
The Surgical Society of Ethiopia	Close collaboration in the piloting and finalization of the Filaricel Surgery Training Package. Development of a peer-reviewed publication on hydrocele surgery.

## Appendix D: Principal Consultants

The MMDP Project engaged a number of long-term consultants during the life of the project, who served as advisors. Each was selected for technical expertise in trachoma, lymphatic filariasis, and/or surgery for trichiasis or hydrocele.

Name	Role	Affiliation
Dr. Catherine deVries	Surgery Consultant, LF Technical Advisory Board	University of Utah
Dr. Emily Gower	Senior Scientific Advisor, Trachoma; Trachoma Technical Advisory Board Chairperson	University of North Carolina
Dr. Adama Guira	FASTT Trainer	Ministry of Health, Burkina Faso
Dr. Amir Bedri Kello	Global HEAD START Master Trainer	Currently with WHO
Dr. Andre Kengmogne	Assistant TT Surgeon Trainer	Consultant Ophthalmologist, Cameroon
Charles (Chad) MacArthur	NTD Advisor (transitioned from consultant to part-time employee in February 2019)	MacArthur/Tapert Global Health Consulting
Dr. Sunny Mante	Consultant for Hydrocele Surgery and LF Management	AFMP
Zeina Sifri	LF Advisor (transitioned from employee to consultant in December 2018)	Global Health and Development, LLC



## Appendix E: Presentations and Contributions at International Meetings

Dates	Meeting	Presentations and Contributions
April 23-24, 2015	Multi-Country TT Meeting (Hammamet, Tunisia)	The project presented an update on the MMDP Project and participated in facilitation of meeting including working groups, next steps, and closing.
April 27-29, 2015	GET2020 Meeting (Hammamet, Tunisia)	Participated in facilitation of two breakout sessions: What do the WASH community need from Trachoma? Plans of Action: NGOs
September 13 – 16, 2015	NTD NGDO Network Meetings (NNN) (Abu Dhabi)	The project presented an update on the MMDP Project
October 22-23, 2015	Coalition for Operational Research on NTDs (COR-NTDs) (Philadelphia)	Presentation by MMDP Project: Data Verification and Quality Assurance – Current Practices and Opportunities in Trichiasis Programs
November 4-6, 2015	Global Trichiasis Scientific Meeting (Cape Town)	Presentation by MMDP Project: Post-operative follow-up at 3-6 months following TT surgery: an example from Mali
December 2-3, 2015	USAID NTD Partner's Meeting (Washington, DC)	Presentation by MMDP Project: MMDP Project Progress and Challenges
March 1, 2016	GNNTD Student Advocacy Day (Washington, DC)	HKI presented on the MMDP Project: Morbidity Management and Disability Prevention (MMDP) Project
April 23-29, 2016	Trachoma Scientific Informal Workshop, GET2020, and ICTC (Sydney)	TSIW Presentation: The use of a Surgical Simulation Device for Refresher Training in Trichiasis Surgery
September 29-30, 2016	NTD NGDO Network Meeting, DMDI Meeting, LF NGDO Meeting (Washington, DC)	MMDP Project Presentations: MMDP Project Experience with LF Patient Estimates; MMDP Project Resources for National Programs and NGOs
October 2016	Annual Lymphatic Filariasis NGDO Network Annual meeting (Washington, DC)	Presentation on MMDP Project Hydrocele Surgery Training Package and WHO LF MMDP Toolkit
October 2016	Trachoma Coordinating & Implementing Partnership Capacity Building Meeting (Dubai)	Presentation from MMDP Project: Global Review - MMDP Project
November 2016	65 <sup>th</sup> Annual American Society of Tropical Medicine and Hygiene (ASTMH) Conference (Atlanta, GA)	MMDP Project presented four posters: Patient Perceptions of Trachomatous Trichiasis Surgery in the Far North Region of Cameroon; Implementation of a facility-based inspection tool to assess quality of lymphedema management services in Vietnam; A Delphi Consultation to Assess Indicators of Readiness to Provide Quality Health Facility-based Lymphedema Management Services; Quality Assessment of the Implementation of the Trachomatous Trichiasis Surgery in Poli Health District, Cameroon, using SWPO Method (Success, Weaknesses, Potentials, and Obstacles)
March 2017	European Association of Urology's Annual Meeting	Presentation on the MMDP Project's work on the Filaricele Anatomical Surgical Task Simulator (FASTT)
March 2017	Pan African Urological Association's Annual Meeting	Presentation on the MMDP Project's experience implementing the Filaricele Anatomical Surgical Task Trainer (FASTT)
April 2017	GAELF	Zeina Sifri presented the Filaricele Anatomical Surgical Task Trainer (FASTT) Training Package: African Filariasis Morbidity Project/MMDP Project
	GET2020 Alliance Meeting	Joe Amon presented an overview of the MMDP Project
	2017 Trachoma Scientific Informal Workshop (TSIW), ICTC Meeting	Dr. Gower represented the MMDP Project at the meeting where she served as co-Chair

September 2017	NTD NGDO Network Meeting (Dakar)	Joint session organized with RTI: NTD Morbidity Cases: TT and LF case estimate methodologies
September 2017	USAID's Global Health Mini-University	Hosted a practical session: Quality Assurance in Surgical Management of Neglected Tropical Diseases
November 2017	Annual Meeting of Coalition for Operational Research on Neglected Tropical Diseases (COR-NTDs) (Baltimore, MD)	Breakout Session led in partnership with Kilimanjaro Center for Community Ophthalmology, Sightsavers, and the University of North Carolina at Chapel Hill: Post-trichiasis surgery follow-up at 3-6 months: Experiences and lessons learned; Presentation on the FASTT Simulator: Filariciele Anatomical Surgical Task Trainer FASTT
November 2017	66 <sup>th</sup> Annual American Society of Tropical Medicine and Hygiene (ASTMH) Conference (Baltimore, MD)	Joint Symposium with UNC: Follow-up tools for surgical quality assurance  Oral Presentations: TT Screening and active case finding – An opportunity for eye health programs: A case study of the MMDP Project in Burkina Faso; Experiences from Burkina Faso and Cameroon: Quality assurance using hydrocele surgery follow-up tools; Follow-up on hydrocele surgery quality outcomes: The experience of the Surgical Society of Ethiopia; Outcomes of a Pilot Hydrocele Surgery Camp in Ethiopia; Supportive Supervision for Trichiasis Surgery  Poster Presentations: Management of the quality of trichiasis surgery services in a community setting in Cameroon: implementing a quality assurance approach; Confirming Trachomatous Trichiasis prevalence: Pilot TT-only surgery in Touboro health district in Cameroon
March 2018	NTD NGDO Network's Disease Management Disability and Inclusion Working Group Meeting	MMDP Project presented remotely on the trachoma- and LF-related MMDP indicators collected under the project
April 2018	GAELF Meeting (New Delhi India)	Led report preparation and presentation of the MMDP Working Groups
September 2018	NTD NGDO Network Meeting, ICTC, and LF NGDO (Addis Ababa, Ethiopia)	MMDP Project gave two presentations: Progress in Addressing Post-operative Trichiasis; LF Activities under the MMDP Project
October 26-27, 2018	Coalition for Operational Research on Neglected Tropical Diseases (COR-NTD) Meeting	Organized joint session with the WHO on the integration of LF MMDP Activities into National Health Systems for Universal Health Coverage
October 28, 2018	Trachoma Scientific Informal Workshop (TSIW)	MMDP Project gave two presentations: Trichiasis Case Finding in Burkina Faso & Cameroon: The MMDP Project's Experience; Photography of Operated TT Cases to Explore Predictors of Surgery Outcomes: The MMDP Project's Experience in a Programmatic Setting
October 28 – November 1, 2018	American Society of Tropical Medicine and Hygiene (ASTMH) Annual Meeting (New Orleans, LA)	MMDP Project presented five posters: The “last mile” of trichiasis management in Cameroon: Challenges with aligning implementation and epidemiological data at the threshold of trachoma elimination; Quality of Life Changes and Post-Operative Follow-Up of Hydrocele Surgery Patients in Burkina Faso; Community-based approach to identify hydrocele cases: Results of a pilot in five health districts in Cameroon; Identification of barriers to hydrocele surgery: Case study of the Bibemi and Kar-Hay health districts in Cameroon; Strengthening the quality of trachomatous trichiasis surgical services: Using an integrated supportive supervision approach
June 23 – 28, 2019	2019 TSIW Meeting, GET2020, ICTC	TSIW - MMDP Project Presentation: Photography of Trachomatous Trichiasis (TT) Cases; GET2020 – MMDP Project presented in panel on lessons learned from USAID Projects; ICTC – MMDP Project Participated in meeting